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CURTIS'S BOTANICAL MAGAZINE.

CONTAINING HAND-COLOURED FIGURES, WITH DESCRIPTIONS AND OBSERVATIONS ON THE
BOTANY, HISTORY AND CULTURE OF NEW AND RARE

PLANTS FROM THE ROYAL BOTANIC GARDENS, KEW,
AND OTHER BOTANICAL ESTABLISHMENTS AND PRIVATE GARDENS.

EDITED BY

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“With tender heed,
Bringing thee chosen plants and blossoms blown
Among the distant mountains.” — *Wordsworth*.

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To
EDWARD AUGUSTUS BOWLES,
M.A., F.L.S., F.E.S., V.M.H.

GARDENER, INVESTIGATOR AND AUTHOR, SUCCESSFUL IN
PRACTICE, KEEN IN RESEARCH AND BRILLIANT IN EXPRESSION
AND STYLE, THIS VOLUME IS DEDICATED AS A TOKEN OF
APPRECIATION AND GRATITUDE

BY THE
ROYAL HORTICULTURAL SOCIETY.



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ERRATA.

Tab. 9098—Read on p. 1, line 7—POLYGONUM CAMPANULATUM for
POLYGONATUM CAMPANULATUM

Tab. 9100—Read on p. 1, line 10—LXXV for LXXXV.





TAB. 9082.

CLERODENDRON COLEBROOKIANUM.

India.

VERBENACEAE. Tribe CLERODENDREAE.

CLERODENDRON, Linn.; *Benth. & Hook, f., Gen. Plant.* II. 1155; *Briquet in Engl. & Prantl, Nat. Pflanzenf.* IV. 3a. 174.

Clerodendron Colebrookianum, Walp., *Repert.* IV. 114 (1846); a *C. infortunato*, Gaertn.; cui approximatum, foliis leviter cordatis vel truncatis mox glabratiss, calyce minore, corollæ tubo tenui longo admodum distinctum.—Schauer in DC., *Prodr.* XI. 672 (1847); Gamble, *Ind. Timb.* 299 (1881); ed. 2. 543 (1902); C. B. Clarke in Hook. f., *Fl. Brit. Ind.* IV. 594 (1885); Pottinger & Prain in *Rec. Bot. Surv. Ind.* I. 259 (1898); Brandis, *Ind. Trees*, 507 (1906); King, *Mat. Fl. Malay Penins.* in *Journ. As. Soc. Bengal*, LXXIV. 837 (1909); Craib, *Contr. Fl. Siam*, 165 (1912); Ridley, *Fl. Malay Penins.* II. 629 (1923).

Syn. *C. glandulosum*, Colebr. ms. in Wall. Cat. no. 1806 et ex Voigt, *Hort. Sub. Calc.* 466 (1845), nomen; non Lindl.

This plant was named by Joh. Conrad Schauer, the monographer of the *Verbenaceae* in De Candolle's *Prodromus*, after the great sanscrit-scholar and able naturalist, Henry Thomas Colebrooke, who had originally proposed to call it *C. glandulosum*. It had been introduced to the Botanic Garden at Calcutta by M. R. Smith, one of Wallich's correspondents, from "Pundua" (this, as in many other cases, means merely the Khasia Hills), where the plant is of common occurrence. Its area extends northwards to the Sikkim Terai (to 1,800 m.), southwards to Lower Burma, and possibly the Malay Peninsula (see Ridley, l.c.), and in the eastern direction to Southern Yunnan and Tonkin. *C. Colebrookianum* grows mostly on the edges of forests, and often springs up in great numbers in newly made clearings. It differs so clearly from *C. infortunatum* (see Bot. Mag. t. 1865 under *C. viscosum*), that it is not necessary to enlarge on its distinctiveness in this connection.* On the other hand, it approaches rather closely to some forms which more recently have been collected in southern China. These, however, still await critical examination and description. The plant

* I would, however, point out that all the eastern specimens which I have seen have very short calyx-teeth, although in other respects they agree well with the Khasia plants. These specimens are Lace, 5,877 from Maymyo, Burma; Kerr, 812 from Dooi-Sootep, near Chiengmai, Siam; Forrest, 8,754 from the Shweli Valley at 25° N.; Henry 11,390 from Mengtsze and 12,421 from Szemao, Yunnan; and Balansa 3,826 from Tonkin.

from which the material for our plate was taken has long been in cultivation at Kew, where it is grown planted out in the Himalayan section of the Temperate House, flowering and fruiting freely and regularly every year. Although the numerous corymbs of white flowers and the rich green of the bold foliage are pleasant enough, the main interest is in the peculiar colouring of the fruits and the persistent calyces which support them. The latter grow out after fertilisation so as to form ultimately blood-red irregularly pentagonal or 5-lobed fleshy discs, whilst the drupes as they ripen pass from grass-green through all shades of verdigris-green and turquoise-blue to a final steel-blue, contrasting vividly with their red support. Their colouring is confined to a thin, hardly fleshy exocarp within which the horny endocarp forms a hard shell around the seeds. This vivid colouring of the fruit occurs frequently in *Clerodendron*, and strongly suggests an adaptation for seed-dispersal, but there are no observations recorded which might throw light on the subject. Its congener, *C. infortunatum*, has the reputation of being poisonous, and its name rests, in fact, on that reputation; but here also there is much room for further investigation. The peculiar large glands (nectaries) which may be found on the calyx-tubes and, irregularly dispersed, on the underside of the leaf-blades, are of a type not uncommon in *Clerodendron*. They have been studied by Professor J. Reinke more especially in *C. fragrans* (see Pringsh. Jahrb. Wissensch. Bot. x. p. 155, t. XII. fig. 13), where they arise from the epidermis which divides into three layers, the outermost of which consists of prismatic cells. This layer produces a sugary secretion, which finally bursts the cuticle. The part which these nectaries play in the economy of the plant is still obscure.

DESCRIPTION.—A large *shrub* or small *tree* up to 2·5 m. high, with a silver-grey bark, glabrous, excepting the youngest growth and the inflorescences; branches soft, green, stout, 4-angled, grooved. *Leaves* borne on terete stalks up to 20 cm. long; *blades* broad-ovate to rotundate-ovate from a truncate or shallowly cordate base, acuminate, up to 30 cm. long and almost as wide, entire with an obscurely wavy and sometimes minutely glandular-denticulate margin, membranous, dark-green above, paler on the back, when

young very finely scurfy on the principal nerves on the face and all over the nervation on the back, and besides loosely and minutely glandular in the areoles, soon quite glabrous, here and there with transparent roundish spots (nectarial glands) which dry black; lateral nerves 7-9 on each side, alternating except the lowest pair. *Corymbs* terminal and lateral from the leaf axils, borne on stout rather stiff peduncles, the lower of which are up to 15 cm. long, dichotomous, dense, many-flowered, up to over 10 cm. in diameter; *bracts* lanceolate to filiform, early deciduous; pedicels 2-5 mm. long, all axes greyish, downy, with short papillose hairs. *Calyx* campanulate, 3 mm. long, greyish with variously placed green nectarial glands on the outside of the tube; lobes triangular to lanceolate, acute, almost as long as or conspicuously shorter than the tube; the whole calyx growing out in the fruiting stage into an irregularly pentagonal fleshy red or rose- or flesh-coloured disc up to over 1.5 cm. across, with the lobes mostly recurved. *Corolla* white or faintly tinged with rose in the mouth; tube very slender, 20-25 mm. long, glabrous; limb about 12 mm. across, lobes ovate to ovate-lanceolate, subacute. *Filaments* up to 15 mm. long; anthers 2 mm. long, dark. *Style* up to over 4 cm. long; stigma-lobes subulate, very short. *Drupe*s depressed-globose or ellipsoid, grooved, 8-11 mm. by 7-9 mm. in diameter and 6-7 mm. high, when maturing changing from green through turquoise-blue to a deep glossy bluish-black; pericarp, horny. *Seeds* oblong ellipsoid, with a fine, dark membranous testa, 5-6 mm. long.

DISTRIBUTION.—Eastern tropical continental Asia from Sikkim to Lower Burma and Tonkin. O.S.

Fig. 1, a part of a flowering branch with the leaf blades cut off, nat. size; 2, a flower, $\times 2$; 3, the same in longitudinal section, $\times 2$; 4, a stamen, $\times 12$; 5, stigma, $\times 50$; 6, cross-section of ovary, diagrammatic; 7, cross-section of mature fruit, $\times 2$; 8, a seed, $\times 2$; 9, the same in longitudinal section, $\times 2$.





1. Smiling docket lily

TAB. 9083.

RHODODENDRON ANTHOSPHAERUM.

China.

ERICACEAE. Tribe RHODODENDREAE.

RHODODENDRON, Linn.; *Benth. & Hook. f., Gen. Plant.* II. 599; *Drude in Engl. & Prantl, Nat. Pflanzenf.* IV. 1. 35.

Rhododendron anthosphaerum, *Diels in Not. R. Bot. Gard. Edinb.* V. 215 (1912); arcte affine *R. ceraceo*, Balf. f. et W. W. Smith, sed foliis in dorso plane papilloso opacis (haud ceri-verniosis nitentibus), rhachi racemi rubro-floccosa, corolla saepe 6-vel 7-loba paulo maiore diversa.—*Millais, Rhododendrons*, ed. I. 114 (1917); ed. II. 82 (1924).

Syn. (?) *R. hylothreptum*, Balf. f. & W. W. Smith in *Trans. Bot. Soc. Edinb.* XXVII II. 195 (1917) pro parte.

In April 1906, G. Forrest collected on the ascent from the Langkong (Lang-Kiang) valley (about $100^{\circ} 15'$ E. and $26^{\circ} 30'$ N.) to the Sungkwei Pass at an altitude of 3,000 to 3,300 m. a rhododendron which he describes on his field label (No. 2042) as a "shrub or small tree of 20-30 ft.; flowers bright rose-magenta with a few markings of black-crimson." Four years later Forrest found in the same pass, but slightly higher up (3,300-3,600 m.) and later in the season (May), another rhododendron with the "flowers deep magenta-rose with darker markings." This he says, was "a shrub 10-15 ft" high (No. 5845) or a "tree of 20-30 ft." in height (No. 5848). The plant of the earlier collecting was described in 1912 as *R. anthosphaerum* by Professor L. Diels, that of the later collecting as *R. hylothreptum* by Sir Isaac Bailey Balfour and Professor W. W. Smith (1917). Seeds of what was assumed to be *R. hylothreptum* were received from Forrest under No. 5848. Writing in 1917 of *R. hylothreptum*, Sir Isaac says of the young plants raised from those seeds, that "all these do not show the characters we expect in *R. hylothreptum*, but they are too young as yet to offer sound evidence in reply to the question—What are they?" Then he adds that there is another plant from Forrest with the label:—"E.N.W. Yunnan, near the summit of the Sungkwei Pass, Alt. 10,000 ft. Lat. $26^{\circ} 12'$ N. In rhododendron forest. Tree of 20-30 ft. Flowers crimson-rose with deep crimson markings—No. 5852, May 1910. This is our species, but

it shows the ovary clad more or less with solitary or floccose hairs. In this there is an approach to *Rhododendron anthosphaerum*." Now the plant illustrated here was raised by Mr. E. J. P. Magor at Lamellen, St. Tudy, Cornwall, from Forrest's seed No. 5848 which had been received by him as *R. sphaeranthum*, a name, that, however, was subsequently changed by Sir Isaac to *R. hylotreptum*. Compared with Sir Isaac's very full descriptions of *R. sphaeranthum* and *R. hylotreptum*, it tallies in some respects with the former, in others with the latter, and in others again with neither, and the same is the case if we compare it with the respective field-specimens. Yet their general facies is so much the same that any unbiassed observer would pronounce them as "specifically" identical. Here are the diagnostic characters, insisted upon by Sir Isaac, set out in parallel columns.

<i>R. hylotreptum.</i>	<i>Our Plant.</i>	<i>R. anthosphaerum.</i>
<i>Leaf-stalks</i> , 1.5–2cm. long,	1–1.4cm. long,	usually 2cm. (1.5–2)* long.
<i>Bracteoles</i> with adpressed or loose hairs,	whitish plumose,	reddish, sericeous-pilose.
<i>Calyx-lobes</i> glandular-puberulous outside,	all but glabrous, a few minute hairs at the base,	clavate-glandular, floccosely and greasily pilose outside.
<i>Corolla</i> , blotched and spotted (or only blotched), puberulous inside,	blotched, glabrous or very sparingly papillose inside,	blotched and spotted (or only blotched or only very obscurely spotted), puberulous inside.
<i>Corolla-lobes</i> , 6 or 7,	6 or 7,	5 or 6.
<i>Filaments</i> , copiously puberulous to the middle or beyond,	glabrous,	finely puberulous from the base to above the ovary (very scantily and minutely puberulous).
<i>Ovary</i> typically glabrous (at times floccose),	glabrous except for the vestiges of a few very minute scattered hairs,	sparingly coated with flocks of greasy hairs or single greasy hairs or with cauliflower-glands.

* The bracketed characters are taken from the field specimens.

As can be seen from this table the differences are minute and almost without exception differences of grade as one might expect in a population subject to variation owing either to ordinary fluctuation or to the interbreeding of very small strains such as might possibly be isolated and maintained pure under artificial conditions, but could hardly maintain themselves unmixed in nature when growing side by side. Considering this and the fact that all the specimens concerned originated from a very small area of uniform character—"open situations" and "rhododendron-forest between 3,000 and 3,300 m.," it serves, I think, no practical purpose to

distinguish as species forms whose stability is under natural conditions quite unreliable. This is not meant to disparage the value of the fine analytical work of the Edinburgh school as a necessary basis for our understanding of the relationships of the bewildering mass of forms in which the rhododendrons of Eastern Asia present themselves to us, but it certainly affects our translation of those conditions into practical scientific language. If superficial or purely theoretical synthesis confuses, analysis carried to extremes obstructs. *R. anthosphaerum* (and *R. hylothreptum*) has been grouped by Balfour with *R. ceraceum* and *R. lukiangense*, both distinct from, although closely allied to, our plant and both of a more western distribution (Salween basin), and not in cultivation. I have already referred to *R. ceraceum* in the Latin diagnosis. As to *R. lukiangense*, this has, like *R. ceraceum*, the leaves epapillose and wax-varnished on the back, but its corollas are much smaller (2·5–3 cm.) and more tubular than in that species. All these species form part of the *irroratum*-series of Balfour which, as understood at present, covers nearly forty species, ranging from Burma and Bhutan to Southern Szechuan and Yunnan and, in the case of one species, to Formosa. *R. anthosphaerum* has so far—Mr. Magor's plants were raised in 1911—proved hardy in North Cornwall (where it does best in sheltered places with north aspect), although owing to its early flowering (end of March) it is liable to suffer from frost.

DESCRIPTION.—A *shrub* or *tree* up to over 9 m. high. *Leaves* distinctly stalked, crowded at the upper end of the season's growth; blade oblong-lanceolate to lanceolate, acute at both ends with a hydathode at the tip, 8–11·5 by 2–3·5 cm., thinly leathery, mature quite glabrous, except for vestiges of the juvenile hair-covering, *matt and dark green on the face, matt and pale or at length, when dry, dull-tawny on the back* with very few scattered minute glands and a *papillosely granular epidermis*, primary nerves slender, up to 18 on each side, reticulation very delicate and close, rather obscure, margins cartilaginous, very slightly rough; leaf-stalk about 1·2 cm. long, glabrescent. *Floral bud-scales* broad-ovate, up to 15 mm. long, thinly leathery downwards, otherwise papery to membranous, without a midrib or

mucro, rufously hairy at the base. *Flowers* in dense heads of up to 12; rhachis 1 cm. long, rufously hairy; bracts deciduous, obovate-oblong to spatulate, up to 3.5 cm. long, membranous, silky without and rufously ciliate at the tips; bracteoles linear, up to 1 cm. long, more or less shortly plumose; pedicels 1.5 cm. long, sparingly glandular or floccose to glabrous. *Calyx* reduced to a shallow fleshy cup with short broadly deltoid lobes, glandular-puberulous to all but glabrous. *Corolla* bell-shaped, 5-7-lobed, 4-5 cm. long and as wide across the limb, a rich deep rose, paling in the lobes, with a purple-black small blotch at the base of the back and with or without darker spots besides, glabrous or very sparingly papillose at the base within; lobes rotundate-elliptic, emarginate, 1.5-2 cm. long and about as wide. *Stamens* 10-14; filaments unequal, deep rose downwards, whitish above, glabrous (as in fig. 4) or sparingly papillose below or copiously puberulous to the middle or beyond, the longest up to 3 cm. long. *Ovary* conical-oblong, widened at the base into a slightly lobed disc (as in fig. 5), green, glabrous with a few minute vestiges of fallen hairs; style up to 7.5 cm. long, glabrous, greenish (as in fig. 5).

DISTRIBUTION.—Northwest Yunnan, Sungkwei Pass in the mountains north of the Lake of Tali 3,000-3,300 m.

O.S.

Fig. 1, a flowering branch, nat. size; 2, a bracteole, $\times 6$; 3, posticous part of the corolla, from within, nat. size; 4, a stamen, $\times 3$; 5, a pistil, $\times 3$.



TAB. 9084.

ROSCOEA CAUTLEOIDES.

China.

ZINGIBERACEAE. Tribe HEDYCHIEAE.

ROSCOEA, J. Smith; *Benth. & Hook. f., Gen. Plant.* III. 641; *K. Schum. in Engl. & Prantl, Nat. Pflanzenf.* II. 6, 18, et in *Engl., Pflanzenreich* IV. 46, 115.

Roscoeia cautleoides, Gagnep. in *Bull. Soc. Bot. France*, XLVIII. p. LXXV. (1901); arete affinis *R. sinopurpureae*, Stapf (*R. capitatae* var. *purpuratae*, Gagnep.), sed floribus multo praecocioribus, foliis multo angustioribus, bracteis magis approximatis, labio fere ad basin diviso, anthera duplo brevior distincta. A *R. capitata*, Smith, foliis paucioribus angustioribus, capitulis oblongis, bracteis angustioribus, labio lato imbricato-bifido longe distat.—*Journ. R. Hort. Soc.* XXXIX., p. cxxxiii. fig. 146 (1913); H. Maxwell in *Gard. Chron.* LIX. 300 (1916); S. Arnott in *Gard. Chron.* LXVII. 101 (1920).

In writing of *Roscoeia Humeana* in the last part of this Magazine (Vol. 151, part i. t. 9075), attention was called to the existence of yellow-flowered forms in this generally purple-flowered genus. The plant figured here is a fitting illustration of this fact. Its flowers, on account of their colour, are in vivid contrast with those of all other roscoeas which have so far been taken into cultivation—otherwise they conform with them in structure and disposition—and it was this colour-contrast more than anything else that suggested the trivial *cautleoides*. So far this distinctive colour, a pure lemon-yellow, has maintained itself in the large stock of plants which has been raised from the original batch of seeds introduced by Messrs. Bees, of Liverpool.* From its home, however, colour variations of a wide range are reported. The Abbé Delavay, who discovered it in the summer of 1883 in the pastures and the scrub of the mountain-sides above Lankong, about 25 km. to the north of the Lake of Tali, describes the flowers as yellow or purplish (“purpurines.”) Forrest, who collected it in 1916 (no. 2070) in dry, open situations amongst rhododendron- and pine-scrub on the eastern flank of the Lichiang range between 2,700 and 3,000 m., noted the colour of the flowers as “canary-yellow,” but he also collected at the same time and under the same conditions specimens (no. 2178) whose flowers were of a “rich deep purple.” These were distributed subsequently as *R. cautleoides*, Gagnep. var.

* It is from this introduction that the plant depicted here originated.

purpurea. The same colour-variation appears in Forrest's later collections in the same district, only a few miles further north (nos. 5890 and 5969); but the colour-range will be found even wider if specimens collected by Camillo Schneider in Southern Szechuan at 3,000 m. in 1914 (no. 1232) are really referable to our plant, their flowers varying from violet to pale rose and white. I have insisted on this point, because it holds the promise of a great and pleasing variety in a plant which, owing to its hardiness and the ease with which it can be grown, ought to be welcome in every garden. A compost of lime and leaf-soil with a little sand is recommended, and in this it should be planted about 6 inches deep. As it is a late starter, it is, of course, advisable to mark the site of the plant so that it should not be overlooked during garden operations early in the year. The particular plant figured here was grown in the rock-garden at Kew by the side of *R. Humeana* and *R. purpurea*. It flowered here as early as the middle of April, but in the more northern gardens flowering is delayed till June, continuing well into July and even August.* The leaves grow much after flowering, and their final condition in combination with the fruiting spike ought to be very helpful in the discrimination of the species which, if resting solely on the flowering state, is often very difficult, particularly in herbaria. The natural area of the species is defined by the localities mentioned above. It is apparently limited to the mountains north of Tali as far as the confines of Szechuan.

DESCRIPTION.—A perennial herb, in flower up to 20 cm., in fruit up to 60 cm. high, with ovoid-oblong to club-shaped fleshy roots (see fig. 3). *Sheathing cataphylls*, mostly three, obtuse. *Leaves* beginning to develop with the flowers (in cultivation) or *after them*, finally about four, more rarely five; sheaths in the flowering state up to 5 cm., finally up to 30 cm. long, herbaceous, striate; ligule represented by a narrow, delicate hyaline margin, 5 cm. long with a rounded free tip, 2 mm. long; *blades lanceolate to lanceolate-linear, long-attenuated upwards*, acute, the second finally about 7 cm. by 2.5 cm., *the uppermost up to 40 cm. by 1.8 cm. with a stout keel*, channelled on the face, roundish on the back,

* Mr. Hope, Head Gardener to Mr. A. K. Bulley, of Ness, Neston, sent me a fine spike of four flowers on August 17th of this year.

all bright or ultimately dull green on the face, paler underneath, downwards wavy with a fine hyaline margin. *Spike* borne on an erect peduncle which in the flowering state is up to over 12 cm. long, but *ultimately grows up to 50 cm. high, few- to 8-flowered*; *bracts oblong to oblong-lanceolate, acute, 3.5–6.5 cm. long, up to 1.5 cm. broad (flattened out), green at the base and on the sides up to the middle, otherwise reddish in the flower, then wholly green*; rhachis at length up to 2 cm. long. *Flowers lemon-yellow or rose, deep-purple or white (?)*. *Receptacle* semi-cylindric, about 12 mm. long: see figs. 8 and 9. *Calyx 3 cm. long*, as in figs. 4 and 5. *Corolla-tube* exerted from the calyx by up to 1 cm.; posticous lobe concave or hooded, obovate, apiculate, 2.5 cm. by 1.5 cm.; lateral lobes oblanceolate, subacute, 2 cm. by 6–7.5 mm. *Staminodes* pale, 1.8 cm. long, as in figs. 6 and 7. *Lip* cleft almost to the base, 3 cm. by 2.5 cm., *concave to almost flat*; lobes *somewhat obliquely obovate, imbricate, outer margin wavy*. *Filament* about 3 mm. long; anther 7 mm. long, 2-spurred as in fig. 7. *Capsule* oblong, almost terete, up to 1.8 cm. long, crowned by the persistent base of the calyx, splitting to the base into three thinly papery valves. *Seeds* obliquely ellipsoid, 2 mm. by 1.5 mm., pale brown, obscurely keeled at the top, testa minutely wrinkled; a cup-shaped caruncle at the base.

DISTRIBUTION.—North - west Yunnan and Southern Szechuan (?) from 2,550 to 3,000 m.

O.S.

Fig. 1, flowering plant, nat. size; 2, a plant with the leaves more fully developed (the young fruit hidden behind the uppermost leaf), nat. size; 3, a bundle of roots, nat. size; 4 and 5, calyx and receptacle in front and back view, nat. size; 6, a receptacle with the posticous half of the corolla-tube, the staminodes, the anther and the style, nat. size; 7, staminodes and anthers, $\times 2$; 8, longitudinal section of receptacle, $\times 4$; 9, cross-section of the same, $\times 7$; 10, stigma, $\times 8$.



TAB. 9085.

BUDDLEA ALTERNIFOLIA.

China.

LOGANIACEAE. Tribe BUDDLEEAE.

BUDDLEA, Linn.; *Benth. & Hook. f., Gen. Plant.* II. 793; *Solereder in Engl. & Prantl., Nat. Pflanzenf.* IV. 2, 46.

Buddlea alternifolia, *Max. in Bull. Ac. Sc. Petersb.* XXVI. 494 (1880); inter species generis, *B. amentacea*, Kränzl., dubia excepta, foliis alternis distinctissima, caeterum florum fructuumque structura gregis *B. Davidii*, Franch. (*Bot. Mag.* t. 7609 sub *B. variabili*, Hemsl.).—Hemsl. in *Journ. Linn. Soc.* XXVI. 119 (1889); Farrer in *Journ. R. Hort. Soc.* XLII. 63 (1916); On the Eaves of the World, I. 252, II. 3 (1917); Chittenden in *Journ. R. Hort. Soc.* XLVII. 192, fig. 49 (1922).

This handsome shrub marks the northernmost extension of the genus *Buddlea* in Asia if we except the Japanese *B. curviflora*, which in Hondo occurs as far north as 40°. It exhibits at the same time a remarkable deviation from the phyllotaxis typical of that vast genus, its leaves being alternate instead of opposite. This arrangement can also be traced in the crowded leaves sometimes produced at the base of the spurs, but the branching of the inflorescences is typically dichasial. Another peculiarity is the production of the flowers from the shoots of the previous year—obviously a climatic adaptation. In other respects, however, *B. alternifolia* is closely connected with the buddleas of the *Davidii*-group. About thirteen years ago Kränzlin described another alternate-leaved buddlea, *B. amentacea*, from a specimen in the Herbarium of the Botanic Garden at Leningrad, written up as *B. microcarpa*, Kl. It is, however, of uncertain origin and altogether dubious. *B. alternifolia* was, in 1875, discovered by Dr. P. J. Piasezki, who accompanied Captain Posnovski's expedition, in "Southern Kansu," evidently somewhere between Liang-tang and Lanchou-fu. It was next found by Potanin near Tangtshang (Tanch'ang of Farrer, 40° N. in the valley of the Nan Hor) in 1885, and in other places in southern Kansu by Farrer (1914), by F. N. Meyer (1914) and by J. Hers (1922), and it was introduced into cultivation in this country in 1914, when Farrer sent seed (F. 100) home. Farrer collected the seed early in November below Tanch'ang, where, as well as in the neighbourhood of Siku, he had seen it previously in all

the glory of its flower. He says of it :—" It prefers steep, dry banks and open, warm places, where it grows like a fine-leaved and very graceful weeping willow, either as a bush or a small-trunked tree, until its pendulous sprays erupt all along into tight bunches of purple blossom at the end of May, so generous that the whole shrub turns into a soft and weeping cascade of colour." It occasionally invades cultivated land weeping "in cascades of purple along the hedgerows as you thread the comfortable cornlands." *B. alternifolia* has proved perfectly hardy in England, and the ease with which it may be propagated from cuttings of half-ripe shoots should promise it a place in any garden sufficiently large to allow it to grow to its full size. According to Chittenden it requires pruning to induce the formation of the long slender curving wands on which its flowers are produced, but apart from that, needs little attention. "It can also be moved very easily if pruned at the same time."

The name *Buddlea* has given rise to such a variety of spellings—I count nine variations—that it may be worth while to devote a few lines to the subject. The genus was named after Adam Buddle (died 1715), an able botanist, who wrote an excellent English Flora which, however, was never printed, but being, like his herbarium, at Petiver's and Dillenius's disposal, supplied these authors with much valuable material. It was to honour the memory of this man that Houston, between 1730 and 1733, dedicated one of his new genera. Dr. William Houston (also Houstoun) was then travelling in Central America and the West Indies and corresponding with Philip Miller. When he died in Jamaica in 1733 his manuscript-notes passed into the latter's possession; but it was not until fifty years later (1781) that a selection of them, with copper-plate illustrations engraved by Houston himself was published as "*Reliquiae Houstonianae*" by Banks, who had acquired Houston's manuscripts. From these, which are preserved in the library of the British Museum, we learn that Houston himself wrote the name "*Budleia*." Linnaeus, who had no doubt seen Houston's manuscript during his stay in London in 1736, published the following year the new genus in his *Genera Plantarum* altering, however, the spelling to *Buddleja* (*Budleja* in the index). To him as a Swede, *Buddleja* would have read much like *Buddleia*, and the introduction of the

consonantal "J" might be taken therefore for an accidental slip if it were not that in the print he treats the letters "I" and "J" as distinct. However that may be, the "J" was clearly out of place, and this was felt by subsequent writers who substituted for Buddleja (or Budleja) such modifications as Budleia (Adanson, 1763), Buddleia or Budleia (Jussieu, 1789), Budlaea (Swartz, 1791), Budlea (Jaume St. Hilaire, 1805), Buddleya (Franchet & Savantier, 1875). Evidently most of these authors were unaware of the etymology of the name. The original plate of Reliquiae Houstonianae (1781) exhibits a threefold spelling, BUDDLEJA in the heading over the generic diagnosis, BUDDLEIA over the analytical figures of the plate, and BUDDLEA, probably Dryander's annotation, in the footnote to the generic diagnosis. The last spelling (Buddlea) is obviously the correct one, that is conforming with the old-established usage and with the recommendations of the International Code of Nomenclature. It was accepted by Sprengel in his edition of Linnaeus's Philosophia Botanica (1809) and by Lindley in his Vegetable Kingdom. It is at the same time the earliest admissible correction of the grotesque Linnaean Buddleja, and it certainly is most apt to preserve the connection with the name of the man whom it was intended to commemorate.

It remains only to express our obligation to Mr. Lionel de Rothschild, who supplied the flowering material for our plate from his garden at Exbury, Hants, where it flourishes and seeds freely in light gravel soil, particularly if assured of an adequate supply of moisture.

DESCRIPTION.—A *shrub* up to 3 m. high, with all the young parts greyish, owing to the presence of minute stellate hairs (less than 0.1 mm. in diameter); branches slender virgate, soon glabrescent, brown; old bark peeling in thin flakes. *Leaves alternate, subsessile, lanceolate, acute to subacute, entire*, 4–6 cm. by 0.6–1.5 cm., green above with few scattered stellate hairs, silvery grey on the back with minute papillae and loosely distributed stellate hairs, lateral nerves four or five on each side, like the midrib, sunk above when dry. *Inflorescences representing many-flowered subsessile globose spirally arranged clusters*, 2–2.5 cm. in diameter, borne

on very short leafy or leafless spurs on long arching or pendulous branches ; spur leaves, if present, usually much reduced and often shorter than the flower-cluster, the small linear bracts and pedicels (1.2 cm. long) silvery grey. *Calyx* shortly tubular, 2.5–3 mm. long, including the ovate-oblong or elliptic subacute teeth (see fig. 4), with a fine dense silvery covering of minute stellate hairs ; the teeth more or less lengthened in fruit. *Corolla* salver-shaped ; tube slender 6–8 mm. long, reddish-purple and glabrous, or upwards mealy-stellate outside, orange in the eye, yellow and puberulous towards the base inside (see fig. 6) ; limb 5–7 mm. across, rose-purple, 4-lobed, lobes roundish (as in fig. 6). *Stamens* inserted at the middle of the tube ; filaments adnate and decurrent as ridges to the level of the stigma ; anthers up to slightly over 1 mm. (fig. 7). *Pistil* as in fig. 6. *Capsule* cylindric, green, 6 mm. by 2 mm., dehiscent to the middle or beyond. *Seeds* ellipsoid to oblong, variously winged as shown in figs. 10–12, excluding the wings about 1 mm. long, brown.

DISTRIBUTION.—South-eastern Kansu in dry, open situations and in hedgerows in cultivated land.

O.S.

Fig. 1, part of an adult branch, nat. size ; 2, a young shoot, nat. size ; 3, part of a flowering branch, nat. size ; 4, a flower, $\times 4$; 5, a scale from a corolla tube, $\times 100$; 6, a flower in longitudinal section, $\times 5$; 7, anthers, $\times 14$; 8, a capsule ready to dehisce, $\times 7$; 9, the same in longitudinal section, $\times 7$; 10–12, seeds, $\times 15$.



TAB. 9086.

CATASETUM TENEBROSUM.

Peru.

ORCHIDACEAE. Tribe CATASETINAE.

CATASETUM, L. C. Rich.; *Benth. & Hook. f., Gen. Plant.* III. 551; *Pfitzer in Engl. & Prantl, Nat. Pflanzenf.* II. 6. 159.

Catasetum tenebrosum, Kränzl. in Gard. Chron. XLVIII. 229 (1910); ab omnibus speciebus generis hucusque notis florum colore distinctissimum, praeterea columnae antennis brevibus apice convergentibus insigne.

This remarkable plant, whose brownish or reddish black sepals and petals impart to its flowers a singular sombre beauty, which is enhanced by their contrast with the waxy lip, honey-coloured in the centre and greenish towards the brown lateral margins with their whitish crenae, is a native of Peru, whence, according to Kränzlin, it was introduced by Herr P. Wolter, of Magdeburg. It was, however, also grown about the same time in the Botanic Garden at Zürich, where it had been received from Frau Maria von Beust, who, in turn, had it from Señor Alfredo Solf, of Chanchamayo, near Lima. Another specimen in the herbarium of the British Museum from the garden of Mr. W. E. Balston is said to have come from the province of Arequipa in Southern Peru. In the absence of female flowers, and considering our incomplete knowledge of the genus, it would be idle to speculate on the affinity of the species, but I may remark that among the few species of *Catasetum* known from Peru, there are two with very dark sepals and petals, not unlike those of our plant, namely *C. microglossum* (Bot. Mag. t. 8514) and *C. cruciatum*, which Schlechter describes as having "black-violet-brown" sepals. The headquarters of *Catasetum* being in the Andes, North of Peru, and in Brasil, our species is probably one of the southernmost representatives of the genus in the Andes. The specimen, from which the drawing was prepared, was grown at Kew.

DESCRIPTION.—*Pseudobulbs* elongated-ovoid, pale grey owing to the persistent leaf-sheaths, 7–12 cm. by 4–5 cm. *Leaves* about 6; blades oblanceolate, acute, cuspidate, the

longest up to 20 cm. by 5.5 cm., rich green. *Racemes* up to 12-flowered and up to 15 cm. long, borne on an erect peduncle, to over 12 cm. long with about 3 ovate-oblong obtuse appressed barren bracts, about 1 cm. long; flower-supporting bracts, greenish, oblong, acute, about 1 cm. long; pedicels spreading, up to 2.5 cm. long, dark chocolate-brown. *Flowers* up to 6 cm. across. *Sepals* subequal, elliptic-oblong, acute or very shortly acuminate, 3–3.5 cm. by 1.4 cm., the posticous more or less boat-shaped, the lateral rather flat, all deep chocolate-brown to almost black. *Petals* similar, but slightly shorter and more reddish brown. *Lip* fleshy, subcordate, blunt, 2.2 cm. by 2.2 cm., flattened out with crenulate margins, convex with a blunt knob-shaped thickening at the base, honey-coloured with a tinge of green on the sides, passing into chocolate-brown towards the whitish marginal crenae. *Column* in side view obovoid, rostrate, dull and pale brown, 1.5–2 cm. long; *antennae* converging apically, about 4.5 mm. long. *Anther*, including the filament, 9–10 mm. long, as in figs. 4 and 5. *Pollinia*, 2.5 mm. long, caudicles 4 mm. long.

DISTRIBUTION.—Peru.

O.S.

Fig. 1, a whole plant, nat. size; 2, a flower in longitudinal section, with the anther removed, nat. size; 3, lip and column, nat. size; 4 and 5, an anther in front and side view, $\times 3$; 6, pollinium, $\times 3$.

TAB. 9087.

× MALVASTRUM HYPOMADARUM.

South Africa.

MALVACEAE. Tribus MALVEAE.

MALVASTRUM, A. Gray; *Benth. & Hook. f., Gen. Plant.* I. 201; *K. Schum. in Engl. & Prantl, Nat. Pflanzenf.* III. 6. 41.

× **Malvastrum hypomadarum**, *Sprague in Gard. Chron.* XLIII. 394, fig. 176 (1908), intermedium inter *M. capense*, Stapf (non Gareke, vide infra) et *M. scabrosum*, Stapf (vide infra) et verosimiliter ex iis hybridum; habitu nunc ad illud nunc ad hoc vergens, ab illo differt indumento plerumque copiosiore et saepe pilis simplicibus additis aucto, foliis petius acute dentatis (haud obtuse crenatis), floribus multo longius pedicellatis maioribus, tubo staminali e basi altius glabro, carpellis apice tantum stellato-pilosis vel ex toto glabris, ab hoc habitu graciliore, indumento minus glanduloso, foliis minoribus plerumque altius lobatis, petalis pallidis supra unguem striato-maculatis, carpellis plerumque apice stellato-pilosis.—*Gard. Chron.* XLIV. 93, figs. 34–35 (1908), et LXV. 267, fig. 134 (1919).

Syn.: (?) *Malva capensis*, Bot. Reg. t. 295 (1818), non aliorum.

The history of this dainty and long-flowering plant—it is often in blossom for five or six months—has, up to a certain point, been told by Mr. T. A. Sprague in an article in the “Gardeners’ Chronicle” of June 20th, 1908. He traces its occurrence in English gardens back to the beginning of the last century or thereabout. There is, however, in the Herbarium of the British Museum a specimen from Kew which fixes the date when our plant made its first appearance in this country more precisely at 1795 at the latest. Now, South African species of *Malvastrum* have been grown in European gardens since the latter part of the seventeenth century, and by 1800 most of the species then known had been figured, so that it is evident that the group had, up to that time, received much attention. This being so, it is all the more remarkable that no field-specimens of our plant can be traced in the herbaria. We are therefore forced to assume either that, like other South African plants, *M. hypomadarum* has become extinct, or, at any rate, that it has escaped the numerous botanists who have searched the haunts of the earlier collectors, or, finally, that it does not occur under natural conditions and owes its existence to sporting or crossing in cultivation. The instability of its leaf-characters and hair-covering and its apparently erratic vacillation between two perfectly distinct species, which have been in cultivation long before and up to the time when our plant appeared, render the theory of its hybrid origin almost

unavoidable. I have indicated in the Latin diagnosis *M. capense*, Stapf, and *M. scabrosum*, Stapf, as the presumptive parents. I have been obliged to add my name as the authority responsible for the concept covered by these names for reasons which will be evident from the explanation given in the foot-note* below. Here it may be sufficient to state that both species were known, and in cultivation early in the seventeenth century, as can be seen not only from the literature of the time, but also from corresponding specimens still extant in the herbaria at the British Museum and at Oxford; and further, that *M. capense*, as understood here, is a species of somewhat uncertain distribution, but probably a Karroo-type (inner (?) George Division, etc.), whilst *M. scabrosum*, the mistaken *M. capense* of the Flora Capensis, is the commonest of the Cape malvastrums, ranging from the Cape of Good Hope through the whole of the coast-region as far as Natal. Whether the two plants actually meet under natural conditions we do not know. If we accept *M. hypomadarum* as a cross of *M. capense* and *M. scabrosum*, we may describe the respective shares of the parents by saying that *M. hypomadarum* has the generally more slender and virgate habit, the usually smaller and more deeply lobed leaves, the colouring of the petals and the common presence of stellate hairs on the carpels from *M. capense*, whilst the shape of the lobes of the leaves and their more acute toothing, the frequent presence of simple hairs on the axes and on the face of the leaf-blades and the long pedicels are derived from *M. scabrosum*. These parental characters are, however, so mixed that a number of strains

* As the taxonomy of the South-African species of *Malvastrum* is in a truly chaotic condition, I had to work over a large part of the genus to get a proper footing. Owing to the exigencies of space I must confine myself here to a rough summary of the results of my investigation in as far as it concerns the group under consideration. They will be best and most briefly expressed in a list of synonyms:—

Malvastrum capense, Stapf (non aliorum).

Syn. *Malva capensis frutescens grossulariae folio minore, glabro*, Dill. Hort. Elth. 208, t. 169, fig. 206 (1732) = *Malva capensis* (α), Linn. (1753) = *Malva virgata*, Murray (1780) = *Malva divaricata*, Andr. (1801) = *Malvastrum virgatum* var. *Dillenianum*, Fl. Capensis (1860) = *Malvastrum Alexandri*, Bak. fil. (1891).

Malvastrum scabrosum, Stapf.

Syn. *Malva capensis* (γ) Linn. (1753) = *Malva scariosa*, Linn. (1755); *Malva scabrosa*, Linn. (1756) = *Malva capensis* (γ) (*scabrosa*), Linn. (1763) = *Malva balsamica*, Jacq. (1781) = *Malvastrum capense*, Willd. (1801); Garcke (1857); *Flora Capensis* (1860).

I may add that Dillenius's other *Malva Capensis (folio maiore, hirsuto)* l.c. fig. 207 is = *Malva grossulariifolia*, Cav. = *Malvastrum trilobatum*, Bak. fil.

may be distinguished, verging one way or the other. The particular plant from which our plate was prepared and for which we are indebted to the Marquis of Headfort, Kells, Co. Meath, Ireland, combines the slender rod-like branches, the small leaves and the flowers of *M. capense* with the presence of simple hairs on the axes, leaves and calyces, so commonly observed in *M. scabrosum*, and with the glabrescence of the carpels, characteristic of the latter. Lord Headfort's specimens are, moreover, remarkable on account of a morphological peculiarity, which is at variance with the accepted fundamental concept of the genus *Malvastrum*, as a group of uni-ovulate plants, namely, the general occurrence of two ovules with each carpel, both of the same size or the lower smaller, the attachment being the same as, for instance, in *Sphaeralcea*. Of the two ovules, however, only one develops into a perfect seed, the other becoming arrested early during maturation. I have come across the same condition in a specimen of a somewhat different facies which I received from Sir John Ross of-Bladensburg. Can it mean a reversal to a bi- or multi-ovulate ancestral type, released by hybridisation?

M. hypomadarum, as a conservatory plant, is of the most easy cultivation. It can be grown as a pot-plant and be kept within a moderate size, or planted out in a bed and trained along a trellis, when it will form a screen up to 3 m. high. A photograph in the "Gardeners' Chronicle," of August 1st, 1908, gives an excellent idea of the fine effect thus obtained. In the warmest parts of Ireland and England it may also be grown out of doors. It can easily be propagated from cuttings, or it may be raised from seed, although seeding, it seems, cannot always be relied upon. As "*M. capense*" (*M. scabrosum*?) has been grafted on *Abutilon Thompsoni* with good effect, a similar experiment might be tried with our plant.

DESCRIPTION.—A much branched *shrub* from less than 1 m. to over 3 m. high; branches *slender, loosely*, or more densely hairy, *hairs of three types*—(a) *small, stellate, appressed*; (b) *longer, spreading, simple, these particularly upwards*; (c) *very minute, short and gland-tipped*, scattered and often hidden among the other hairs; the type (b) sometimes almost absent. *Leaves shortly stalked; blades very variable*

in the same plant, in different parts or according to the season at which they are produced ; blade ovate in outline from a wedge-shaped base, 3-lobed, *the larger blades 1.5–3.5 cm. long by 1.25–3 cm., those of the arrested shoots much smaller, the lobes of two extreme types—(a) spatulate with a coarsely toothed or 3-lobulate top and long entire sides ; (b) broadly obovate to obovate-oblong, more or less sharply toothed to near the base, the lateral sometimes slightly and unequally 2-lobed, the middle-lobe usually much longer than the side lobes ; hairs as on the stems, in varying combination and quantity, the stellate mainly on the back, the simple on the face appressed and usually short and fine and practically confined to leaves of the b-type of lobing, glands scarce ; stipules herbaceous, lanceolate- or ovate-oblong, up to 2 mm. long ; leaf-stalk 2–3 mm. long. Flowers solitary, rarely in pairs or fascicles of 3, or associated with an accessory flowering shoot ; pedicels slender, 1–2 cm. long, articulated about 3 mm. below the apex, hairs as on the stems ; bracts (epicalyx), 3, linear, narrower downwards, 3–4 mm. long, hairs as on the leaves. Calyx 6–7 mm. long, 5-lobed to the middle, lobes ovate very acute, hairs as on the leaves, usually denser, longer and more often simple along the margins. Petals clawed, obovate or subcordate, not overlapping, 12–15 mm. by 10 mm., white or flushed with pink, with about five short deep-purple streaks fused at the base, claw white or yellowish, ciliate. Staminal tube about 6 mm. long, spreadingly hairy in the upper two-thirds. Carpels glabrous up to near the top, apart from a few very minute glandular hairs, there with a crown of tufted or stellate hairs or almost or entirely glabrous. Styles about 12, pink, 6 mm. long ; stigmas capitate, dark-purple. Cocci obliquely kidney-shaped, about 3 mm. by 3.5 mm., blackish with fine transverse wrinkles, splitting from the incurved apex. Seed 1, rarely 2, and then the upper much smaller and imperfect, reniform-orbicular, up to 2 mm. in diameter ; testa brown, finely granular.*

DISTRIBUTION.—Only known in cultivation.

O.S.

Fig. 1, part of a flowering branch, nat. size ; 2, a flower in longitudinal section, $\times 1.5$; 3, staminal tube (hairs, which are shown in fig. 2, omitted), $\times 5$; 4, pistil (glabrous condition ; for the glandular hairs see figs. 2 and 6) $\times 5$; 5, a fruiting calyx, $\times 2$; 6, the same with the front of the calyx removed, $\times 2$; 7, a coccus, $\times 6$.



TAB. 9088.

ACONITUM ANGLICUM.

England.

RANUNCULACEAE. Tribe HELLEBOREAE.

ACONITUM, Linn., *Benth. & Hook. f., Gen. Plant. I. 9*; *Prantl in Eng. & Prantl Nat. Pflanzenf. III. 2. 60.*

Aconitum anglicum, *Stapf.* (spec. nov.); inter species gregis vel subsectionis *Napelli* (Gayer) combinatione harum notarum insignis:—florendi tempore praeccoci, foliis mollibus pallidioribus in segmenta supra basin eximie cuneatam anguste laciniata dissectis, racemo simplici, floribus lilacino-coeruleis.

Syn. *Aconitum Napellus*, *Purt., Midland Fl. III. 47 (1821)*; *Smith, Engl. Fl. III. 31 (1825)*; *Hook., Brit. Fl. 261 (1830)*; *Smith & Sowerby, Engl. Bot. Suppl. t. 2730 (1834)*; *Syme, Engl. Bot. I. 64, t. 48 (1863)*; *Hogg & Johnston, Wild Fl. Great Brit. IV. t. 270 (1868)*; *Barton in Report Bot. Soc. & Exch. Club Brit. Isl., 1918, 485*; *Moss, Cambr. Brit. Fl. III. 113, t. 110 (1920) et alior. auct. Angl., non Linn. (vide infra).*

(?) *A. Napellus lacinosum*, *Ser. in Mus. Helv. I. 159 (1822)*; *DC., Prodr. I. 63 (1824).*

In many of the cottage-gardens of southern England a monkshood may be seen in flower from the latter half of May to well on in June, rearing moderately dense spike-like racemes of mauvish-blue flowers above a light green foliage of soft, if not limp, leaves deeply dissected into spreading long-pointed lobes whose margins are slightly rolled backwards. There are no particular structural differences in the flowers and fruits to distinguish this early monkshood from the other similar kinds which are common in these gardens, but do not as a rule begin to flower until some weeks later. The same monkshood is found in a wild state here and there throughout the south-west and west of England and the adjoining parts of Wales. It is generally referred to in the local floras as *Aconitum Napellus*, and, owing to its erratic occurrence and the fact that monkshoods have from early times been grown in gardens, it has often been looked upon as an alien. I have failed to locate the English aconite outside England, so that I am forced to the conclusion that it is truly native in this country, which, of course, does not imply that every one of its stations is natural. There is nothing surprising in the spontaneous occurrence in England of a distinct native member of the group generally designated *Aconitum Napellus*, or in the peculiar ecological

conditions of its habitats, which are those of the banks of streams and ponds or of wet woods and shrubberies. There lies a crescent-shaped belt of similarly isolated stations right across north-western Europe from Normandy to Lauenburg and Mecklenburg and northwards as far as Falun in Dalarne. To this belt the English stations join themselves as a most natural continuation, completing the curve in the west. Southwards the western and central sections of the belt are connected by other stations, still widely scattered, with the Jura and the Alps, the latter the very headquarters of the group, whilst the Scandinavian section may primarily be linked with the far poorer subalpine *Aconitum Napellus*-area of the North-Bohemian mountains. Historically all these isolated outpost-stations appear to us to-day as relics of a great northward migration which in post-glacial times helped to people the ice-freed land, and this history is no doubt shared by the English aconite. This community of origin is paralleled by the essential sameness of the ecology of the scattered stations. Everywhere these aconites follow the water—rivers, mountain-brooks and boggy woods. It is clear that the ecology of the English aconite is no exception. In spite of this community of origin and ecology, the aconites of those relic-stations are not a really homogeneous group. That of the Black Forest, the Eifel and Hesse is apparently one type, that of the Scandinavian and North-German stations another, that of Normandy again another, and to them the English aconite will have to be added as still another type. In the Alps the number and frequently also the diversity of forms, which are covered by the popular concept of *A. Napellus*, is still greater. It has early given rise to the recognition of numerous kinds, "species" or "varieties" according to the idiosyncrasies of the authors, and it has led in the minds of many to the concept of an exceedingly "variable," that is unstable, *A. Napellus*, the diversity of whose forms was mainly a question of external conditions, the forms themselves being therefore largely negligible for general and practical purposes. Experience has, however, taught us, that as similar as these forms may be, they are genetically stable and mostly geographically restricted, and it is merely a question of expediency whether we should denote them by binominals or trinominals (with or without

an interpolated grading term, such as subsp. or var.). These alpine "Napellus"-populations, probably already highly diversified in early post-glacial times, were the great reservoir from which the northward migration of which we spoke above drew its supply. No wonder that the relics which it left behind are likewise varied, and yet each in itself stable and geographically restricted according to the time of separation and the particular migration stream from which it originated. They may even have become more sharply defined owing to the reduced chances of the levelling influences which are at work in large continuous populations. Viewed from this standpoint it seems to matter little whether we speak of our aconite as *A. anglicum* or *A. Napellus anglicum*, except for the technical difficulty of fixing on a standard specimen for the wider concept *A. Napellus* and for the advantage of the simplicity and directness of the binominal.

The English aconite is already represented in some of the oldest English herbaria, and it was no doubt one of the several aconites which were grown in the London gardens in Gerard's time; but as a wild plant with a claim to its being a native in this country, it is not mentioned until 1821, when it was recorded to have been discovered (in 1819) by the Rev. Edward Whitehead, Rector of Eastham, Birkenhead, Worcester, on a small affluent of the river Teme and on the Teme itself in northern Herefordshire. It has since been found in the following counties:—Cornwall, Devon, Dorset, Somerset, Hampshire, Berkshire, Monmouth, Herefordshire (other places than the original), Shropshire, Glamorgan and Denbighshire, always growing under conditions as already stated. It is a frequent ornament of cottage gardens and occasionally grown on a commercial scale for the drug market, being one, if not the chief, source of English aconitine. I myself have grown it for many years from tubers received through my friend, Mr. Francis H. Carr, the author of several valuable papers on the aconitines, from the experimental plots of Messrs. Burroughs & Wellcome at Dartford, Kent, and the specimen depicted in this place is one of the progeny of that source. The cultivation of *A. anglicum* is of the easiest. It will thrive in any fairly good soil as long as it is well watered. Although it seeds

freely, its propagation would naturally be mostly from tubers, as this gives quicker results.

DESCRIPTION.—A perennial herb of the “Napellus” type ; tubers up to 9 cm. by 3 cm. at the top. *Stem*, including the inflorescence up to 1 m. high, simple, minutely downy upwards, with fine curled hairs. *Leaves* of the “Napellus” type ; blades 5- to 3-partite, the largest up to 15 cm. across, somewhat soft to almost limp, light green, minutely hairy to almost glabrous, the middle segment wedge-shaped for up to 3 to 5 cm. from the narrow and often stalk-like base, upwards up to 1 to 1.5 cm. wide, then deeply laciniate with the lobes linear to narrowly linear-lanceolate and acuminate, the terminal lobe with a few narrow lobules or teeth, the lateral lobes with 2 or 1 narrow lobule or tooth on the outer side or quite entire, up to over 3 cm. long and 4 to 2 mm. wide, the lateral segments similar, but less divided and more or less asymmetric, all the margins slightly revolute (see fig. 2). *Raceme* erect, moderately dense, simple or rarely augmented by weak and very much retarded accessory racemes from the uppermost leaf-axils, minutely downy (see figs. 4 and 9) ; pedicels, 3 (mostly 2) to 1 cm. long, obliquely erect, or (in fruit) quite erect. *Flowers* mauve to mauvish-blue, minutely downy. *Lower sepals* strongly deflexed, often unequal (see figs. 3, 5 and 6), 12 to 15 mm. long ; lateral sepals as in fig. 4, loosely hirsute, 12 to 17 mm. by 10 to 13 mm., upper sepal (*helmet*) about 18 to 20 mm. high from the base, 12 to 18 mm. wide at the mouth, frontal contour slightly oblique and produced into a short point (see figs. 3 and 4). *Nectaries* almost horizontal on the curved tips of their stalks, with a well defined capitate gland and a recurved 2-lobed lip (as in figs. 3 and 4). *Filaments* hairy in the narrow upper part (fig. 8). *Carpels* 3, almost parallel, glabrous. *Mature follicles* parallel (as in figs. 10 and 11), about 2 cm. long. *Seed* with a wide dorsal wing and two fine frontal ridges, 4 to 5 mm. long, sides very finely wrinkled.

DISTRIBUTION.—South-west and West England and East Wales.

O.S.

Fig. 1, a part of the leafy portion of a stem, nat. size ; 2, a section of a leaf-lobe, $\times 6$; 3, a raceme, nat. size ; 4, a flower in longitudinal section, $\times 2$; 5 and 6, lower sepals, showing their different shape, $\times 2$; 7, nectary, $\times 2$; 8, stamen, $\times 3$; 9, carpels in the flower-stage, $\times 2$; 10, an infructescence, nat. size ; 11, a complete fruit, nat. size ; 12, a seed, $\times 3$; 13, the same in cross-section, $\times 3$.



L. Snelling et W.E. Trevithick del. L. Snelling lith.

TAB. 9089.

BERBERIS VERNAE.

China.

BERBERIDACEAE.

BERBERIS, Linn.; *Benth. & Hook. f., Gen. Plant.* I. 43 et 964; *Prantl in Engl. & Prantl, Nat. Pflanzenf.* III. 2. 77.

Berberis Vernae, C. Schneider in Sargent, *Pl. Wilson.* I. 372 (1913) et III. 440 (1917); inter species sectionis *Sinensium* floribus fructibusque parvis insignis. A *B. sinensi*, Desf. (*B. chinensis*, Poir.) quacum comparata fuit, praeterea foliis plerumque apice plane obtusis (quamvis mucronulatis), racemis densis, fructibus globosis distat.—*Arn. Arb. Bull.* IV. 24 (1918); Rehder in *Journ. Arn. Arb.* V. 140 (1924); Bean in *Kew Bull.* (1922) 109.

Syn. *Berberis Caroli* var. *hoanghoensis*, C. Schneider in Sargent, l.c. I. 368 (1913) et III. 439 (1916); an etiam in *Bull. Herb. Boiss.* ser. 2, V. 459 (1905) ? *

A dainty and very floriferous species which is easily recognised by its dense pendulous racemes of small, somewhat depressed flowers and its small globose fruits. Camillo Schneider described it from specimens collected by Purdom at Minchow in South Kansu (at 2,400–2,700 m.) in 1910. It had, however, already been collected in 1903 by E. H. Wilson (No. 3151) in the Upper Min valley (Northern Szechuan) about 200 km. farther to the south, and again in the same valley at Sungpan in 1910 (No. 4022). It was from the latter collection that *B. Vernae* was first introduced into cultivation through the Arnold Arboretum. A second introduction we owe to Reginald Farrer (No. 486), who collected our plant in the Tatung Mountains, apparently in the neighbourhood of Chobsen, in 1815. None of the collectors remark on the ecological conditions of the habitats of *B. Vernae*, but from the general character of its native country we may infer that it is a distinctly xerophytic type and, from its altitudinal range up to 4,500 m. in the Min Valley, that it should be absolutely hardy in this country,

* This paragraph requires a short explanation. *B. Caroli* var. *hoanghoensis* was originally (1905) established on specimens collected by Potanin, Przewalski and the German explorers Fütterer and Holderer in western Kansu and the adjoining Tibetan territory, and to these were added in 1913 Wilson's specimens from the upper Min valley. Then in 1916 this extended var. *hoanghoensis* was reduced to *B. Vernae*. There is no doubt that Wilson's specimens are specifically identical with the original *B. Vernae*, but I am not so certain about those of the original var. *hoanghoensis* if I may judge by Potanin's collecting. His plant is coarser and has formidable spines up to 5 cm. long, and firm, narrow and rather acute leaves; the fruiting racemes, however, are of the type of *B. Vernae*.

as far as low temperatures are concerned. It has in fact proved to be so, and it has also withstood the much severer conditions of the Arnold Arboretum. In this country it flowers from May to June and ripens its fruit late in September. The Marquis of Headfort, to whom we are obliged for the material (Farrer, No. 486) of our plate, informs me that *B. Vernae*, although a vigorous flowerer, is, with him, somewhat shy in producing fruit, and that moreover such fruit as is produced is very eagerly sought for by birds. Dry and sunny situations would probably affect the fruiting favourably, thus adding to the charm of the profusion of flowers in the early spring that of a wealth of small coral-red pearl-shaped berries.

In the Latin diagnosis I have referred to Desfontaine's *B. sinensis* (1804), a species which has been in cultivation for more than a century, and which forms the subject of a plate in the Botanical Magazine (t. 6573). As Desfontaine's plant was some time ago* said to be identical with the Caucasian *B. vulgaris* (?) *iberica*, Steven et Fisch. (ex DC. 1821) or *B. iberica*, Spreng. (1827), and as, consequently, for reasons of priority, the trivial *sinensis* was transferred from the Chinese to the Caucasian plant, the Chinese plant receiving the new name, *B. Poiretii*, I may be permitted to point out that Desfontaine's and Poiret's statements that their plant came from China, are corroborated by A. P. De Candolle (Syst. II. 8, 1821), who observes that the plant was originally raised by L. G. Lemonnier, Desfontaine's predecessor in the Chair of Botany in the Jardin des Plantes, from seed received from China. This would have been previous to 1799, the year of Lemonnier's death. According to Loudon (Arb. et Frut. Brit. I. 304, 1838), *B. sinensis* was introduced into England in 1800, whether via France or direct from China he does not say. As the species was, however, obtained in the autumn of 1793 by G. L. Staunton, a member of Macartney's embassy to China, between Peking and Johel, where it has since been observed more than once, this collecting may well have been the original and common source of both introductions. As to the Caucasian plant, which we are asked now to call *B. sinensis*, this was discovered by Chr. Steven in "Iberia," that is the upper basin

* C. Schneider in Mitt. Deutsch. Dendrol. Gesellsch, 1906, 180 and in Sargent Pl. Wilson. I. 372 (1913).

of the Kur, better known as Georgia, between 1805 and 1820. Steven labelled his specimens "*B. vulgaris iberica*" and "*B. iberica*" (see Busch in Fl. Caucas. Crit. VII. 216, 1903), and one of them in 1818, through F. Fischer von Waldheim, then in charge of Count Rasumofski's famous garden at Gorenki, near Moscow, reached A. P. De Candolle, who included the plant as *B. vulgaris* (?) *iberica*, Steven et Fisch., in his Systema (1821), whilst Sprengel took it up as a species, *B. iberica* (1827). This plant seems to have been early introduced into cultivation in this country—Loudon says in 1818—probably through F. Fischer, who was in intimate contact with the Horticultural Society of London and its foremost promoters. Sweet and Loudon knew the *B. sinensis* and *B. iberica* as distinct, but later on confusion set in, apparently owing to Lindley's unfortunate identification of the figure of an ill-grown specimen of *B. sinensis* which Watson had published in his Dendrologia Britanica (1825) with Steven's *B. iberica* (see Lindley in Penny Cyclopaedia IV. 261, 1835). However, C. Koch has long ago (Dendr. I. 406, 869) restored the *B. iberica* of gardens to its proper status as a minor form of *B. vulgaris*; it has long been cultivated as such at Kew, and more recently Busch (in Flora Caucasica Critica VII. 216, 1903) has come to the same conclusion from the examination of Steven's originals. There is then no necessity for a change of names, and particularly one which would impose on a Caucasian plant the epithet *sinensis*, an obvious absurdity, even if it were technically correct.

To return to the subject of the present plate, I would only explain that the name *B. Vernae* was chosen by its author in courteous remembrance of the daughter of his friend, Herr Alwin Berger, formerly Curator of the La Mortola garden.

DESCRIPTION.—A glabrous *shrub*, up to over 1.5 m. high, with faintly grooved branches, orange to reddish-brown when young, then darkening, with minute black lenticels. *Spine-leaves* simple, rarely 3-pronged, from an ovate reddish base, the spine 0.5–2.5 cm. long (according to Schneider to 3 cm.), flattened on the face, the largest grooved on the back, yellowish to grey. *Foliage-leaves* in fascicles of 3–4 or more, deciduous, *obovate*, *spatulate* or *oblanceolate*, mostly

quite entire (as in fig. 2), rarely relatively broader and spinously dentate with 6–8 teeth on each side (as in fig. 11), in the typical form gradually passing into a slender stalk (up to 5 mm. long) and rounded at the apex, mostly 2–2.5 cm. by about 1 cm., papery, bright green on the face, paler on the back, nervation inconspicuous. *Racemes* very numerous, *dense, pendulous, 2–3 cm. by about 7 cm.*, borne on a slender bare or 1-bracteate peduncle, up to over 1 cm. long; bracts subulate-lanceolate, equalling the flower stalks, these about 3 mm. long; bracteoles oblong to lanceolate, reddish (see figs. 2, 6, 4), closely adpressed to the flower. *Flowers depressed, 4 cm. in diameter, golden yellow. Sepals 3, broadly obovate, very concave, 2.5 mm. wide. Petals 6 in two whorls, obovate, very concave, the outer 2.5 mm. by 1.5, the inner 1.5 mm. and as wide*, all with a pair of small, but much swollen, glands above the short claw (see figs. 6 and 7). *Filaments 1.25 mm. long; anthers 0.75 mm. long. Ovary almost columnar, stout, 1.5 mm. long; stigma discoid, sessile; ovules 2, from close to the base* (see figs. 9 and 10). *Berries globose, red, up to almost 5 mm. in diameter. Seeds sub-ellipsoid, 2.5 mm. long, as in fig. 12.*

DISTRIBUTION.—West Kansu and North Szechuan, 2,500–4,500 m.

O.S.

Fig. 1, a flowering branch, nat. size; 2, a flower, $\times 2$; 3, the same, seen from below, $\times 2$; 4, a bracteole, $\times 6$; 5, a sepal, $\times 6$; 6 and 7, petals, $\times 6$; 8, a stamen, $\times 10$; 9, a pistil, $\times 10$; 10, the same in longitudinal section $\times 10$; 11, a fruiting branch with unusually toothed leaves, nat. size; 12, a seed, $\times 3$; 13, a fruit, $\times 3$.



TAB. 9090.

ITEA ILICIFOLIA.

China.

ESCALLONIACEAE.

ITEA, Linn.; *Benth. & Hook. f., Gen. Plant.* I. 647; *Engler in Engler & Prantl, Nat. Pflanzenf.* III. 2a. 81.

Itea ilicifolia, Oliv. in *Ic. Plant.* t. 1538 (1886); proxima *I. yunnanensi*, Franch., et *I. Bodinieri*, Lev., sed ab utraque pube nulla vel parcissima, foliis sinuato-spinosodentatis pro rata latioribus distincta; illa praeterea glaucescentia omnium partium differt.—W. W. in *Gard. Chron.* XXXIV. 375, fig. 152 (1903); Kesteven in *Gard. Chron.* XXXIV. 405 (1903); C. Schneider, *Ill. Handb. Laubholz.* II. 395 (1905); Spooner in *Gard. Chron.* XLII. 123, f. 47 (1907) et L.95, fig. 46 (1911); Rehder in *Sargent, Pl. Wils.* i. 44 (1913); Bean, *Trees & Shrubs*, ed. 3, I. 656 (1921).

Itea ilicifolia, in its native country, is a shrub or small tree, 1–3 m. high. Its leaves, Mr. Wilson tells us, so closely resemble those of the common holly, that when not in flower, the *Itea* might easily be mistaken for that plant. At the same time it is, according to the same authority, one of the handsomest of all the Ichang shrubs. Its beauty is mainly in the deep green glossy foliage, but when it flowers, the long, graceful pendent racemes add much to its charm. The shrub was discovered and introduced into cultivation by Augustine Henry in 1886, when he sent seed to Lord Kesteven, who raised plants from it at Casewick House, Stamford, Lincolnshire. A later introduction is due to E. H. Wilson and the firm of Messrs. Veitch & Sons, for whom he collected in 1900. Whilst abundant on the cliffs above the Yangtse, near Ichang, and northwestwards to beyond the Hupeh frontier (Ta-ming Hsien), it appears to be elsewhere scarce, the only other stations on record being wooded hillsides near Nanchwan and cliffs near Wa Shan in Western Szechuan somewhat over 600 km. west of Ichang. Farther south, in Kweichow and Yunnan, it is represented by other species which, whilst very similar in general habit and the structure of the flowers and fruits, lack the peculiar holly-like appearance of the foliage, the leaves being rather flat and their teeth comparatively small. Another species of this type (*I. nutans*) occurs in the Western Himalaya from Kumaon to the Trans-Indus region. Otherwise the genus is widely distributed in tropical eastern Asia, from the foothills of Sikkim and Bhutan to Sumatra, Java and Borneo and,

through Yunnan and Kwangtung, to Formosa and the Philippines. One species (*I. japonica*) is found in Japan (Sikok and Southern Honde) and one (*I. virginica*) in the Eastern States of the Union of North America, from Florida to New Jersey and Pennsylvania in the east and from Louisiana to Missouri and Illinois in the west. These two species, the Japanese and the American, are remarkable on account of their deciduous foliage, all the other species being typical evergreens. *I. virginica* has long been in cultivation, and it was figured in the Botanical Magazine (t. 2409) as long ago as 1823. It has larger petals than the other species, but the structure of the flowers and fruits is the same as in the Asiatic section of the genus, which is, on the whole, very uniform and differentiated in South-eastern Asia into a swarm of species which are often very difficult to distinguish. None of them are in cultivation, nor are they attractive enough to tempt the horticulturist. Botanically, however, they are interesting, as by their range they link the genus to the remainder of the *Escalloniaceae*, which are almost exclusively plants of the southern hemisphere, the only notable exception being *Polyosma*, a large Indo-Malayan genus with the bulk of its species to the north of the Equator. It is this distribution, which in connection with the uniformly shrubby or arborescent habit marks the *Escalloniaceae* as a phylum sufficiently defined to be treated as a family, distinct from the herbaceous and northern *Saxifragaceae* proper. R. Brown (1824) and Lindley (1830) came early to this conclusion, and De Candolle, to whom the now usual inclusion in an enlarged *Saxifragaceae* is due, admitted (1830)* himself that the latter were a heterogeneous group which in the future might have to be broken up. The genus *Itea* was originally proposed by Gronovius and accepted by Linnaeus on the basis of the only American species, *I. virginica*, the name apparently suggesting some resemblance to a willow (*ἰτέα*) in fruit.

Our plant was from the beginning treated as an outdoor plant, and it was found quite hardy at Stamford in a position protected on the north and east by other shrubs. At Kew it was for some time grown in the Himalayan wing of the

* Ordo, habitu equidem heterogeneus, in posterum forsan (iam praeunte cl. Brown) separandus, sed characteres adhuc lubrici videntur.

Temperate House, but a specimen planted against the wall of the Cambridge Cottage garden is in a very vigorous condition and at present about 2·5 m. high. The particular specimen figured here was kindly communicated by Mr. C. J. Lucas, of Warnham Court, Horsham, where the *Itea* grows luxuriantly in a hedge without any particular protection. The plant flowers late in this country (August to September), and does not seem to ripen the seed; but it may easily be propagated by cuttings of fairly ripened wood with a heel.

DESCRIPTION.—A dense evergreen, *perfectly glabrous or nearly glabrous shrub*, up to 3 m. high. *Leaves* alternate or occasionally subopposite, stalked; *blades elliptic to elliptic-oblong or sub-obovate from a short acute base, acute, serrate with prickly teeth, more or less wavy, resembling holly-leaves, 4–9 cm. by 2·5 cm., leathery, dark green and glossy on the face, paler and dull on the back, with 4–5 nerves on each side, transversely veined and loosely reticulate*; stalk up to 1 cm. long. *Racemes* terminal, pendulous, up to over 30 cm. by 1·5 cm., shortly stalked, bracts filiform, hardly over 1 mm. long; flowers mostly in clusters of 3; flower-stalks up to 3 mm. long, reflexed on maturity. *Receptacle* short, cup-shaped, somewhat enlarged and campanulate on maturity. *Sepals* ovate-lanceolate, acuminate, 2 mm. long, green. *Petals* linear, with a minute inflexed almost hooded point, 3 mm. long, whitish green. *Filaments* 2·5 mm. long; anthers 0·75 mm. long, brownish yellow. *Ovary* immersed in the receptacle with the base only, surrounded by an annular disc, gradually passing into the columnar style, with the truncate stigma below the level of the anthers (see fig. 3). *Capsule* ovate-lanceolate, 5 mm. long, 2-beaked owing to the splitting of the persistent style, surrounded by the persistent sepals and petals. *Seeds* spindle-shaped, blackish, testa produced at both ends.

DISTRIBUTION.—Central China, from Western Hupeh to Central Szechuan.

O.S.

Fig. 1, a flowering branch, nat. size (to see it in its natural position, the plate should be looked at with the right hand side forming the base); 2, a flower, $\times 8$; 3, a longitudinal section of the same, $\times 8$.



TAB. 9091.

PAPAVER COMMUTATUM.

Orient.

PAPAVERACEAE. Tribe PAPAVEREAE.

PAPAVER, Linn.; *Benth. & Hook. f., Gen. Plant.* I. 51; *Prantl & Kundig in Engl. & Prantl, Nat. Pflanzenf.* III. 2. 141; *Fedde in Engl., Pflanzenreich*, IV. 104. 288.

Papaver commutatum, *Fisch. & Meyer in Index Sem. Hort. Petrop.* IV. 41 (1837); a *P. Rhoeades*, Linn., quocum olim confusum erat, pedicellis appresse (haud patule) strigosis, petalorum maculo amplo supra basin vel fere ad medium sito, capsula basi breviter sed distincte stipitata differt; a *P. strigosum*, Schur, petalis insigniter maculatis et capsulae indole distinctum.—*Ledebour, Fl. Ross.* I. 89, 744 (1842); *Vilmorin, Fl. Pleine Terre*, 595 (1863) et ed. III. 823 (1870). *Boiss., Flor. Or.* I. 113 (1867); *Jungn. in Bot. Notisk.* 1889, 266; *O. & B. Fedtsch. in Bull. Herb. Boiss.* VII. 771 (1899); *Lipsky, Fl. Cauc.* 215 (1899); *Radde, Grundzüge d. Pflanzenverbreit. i.d. Kaukas. in Engl. & Drude, Veg. Erde*, III. 89, 122, 412 (1899); *Fedde in Engl., Pflanzenr.* IV. 104. 311 (1909).

Syn. *P. commutatum* var. *minimum*, *C. Koch in Linnaea*, XV, 250 (1841).

P. Rhoeades (var. posterior), *Marsch. Bieb., Fl. Taur. Cauc.* III. 363 (1819);

A. Meyer, Verzeichn. Pflanz. Cauc. 175 (1831), non Linn.

P. Rhoeades var. *commutatum*, *Elkan, Tent. Mon. Gen. Pap.* 28 (1837).

P. Rhoeades var. *umbrosum*, *Hort. ex Vilmorin l.c. Suppl.* 133 (1884); *W. Miller in Bailey, Stand. Cycl. Hort.* v. 2457 (1916).

P. Rhoeades obtusifolium, *O. Kuntze in Acta Hort. Petrop.* X. 160 (1887) pro parte.

P. umbrosum, *Hort. in Select. Sem. Hort. Bot. Petrop.* 1873, 34; *W. Thompson ex Gard. Chron.* VI. 16 (1876); *Gard. Chron.* XIV. 274 (1880); *Wittmack in Deutsch. Gartenzeit.* I. 299 c. tab. (1892); *Damman in Gard. Chron.* XX 235 (1883); *Vilmorin, Fl. Pleine Terre, Suppl.* 134 c. fig. (1884); *Gard. Chron.* XXII. 48, fig. 13 (1884); *Mottet in Rev. Hort.* LXIII. 431 (1891); *E. André in Rev. Hort.* LXV. 12 c. fig. et tab. col. (1893); *Semaine Hort.* I. 290, f. 113 (1897).

P. strigosum var. *commutatum*, *Fedde in Kusnez. & Busch, Fl. Cauc. Crit.* X. 25 (1905).

This beautiful poppy is widely distributed on both sides of the Caucasus. Here in the dry grass-steppes it becomes locally a dominant and very brilliant element (see *Radde l.c.* 89), but it also invades cultivated land, particularly corn fields and vineyards, or it settles as a ruderal plant by the road-side, generally behaving very like our common poppy. Northwards it does not advance far beyond the Kuban, but it is on record from the Crimea and even as far west as the Southern Ucraina. It is more common in Transcaucasia, whence it became first known, and *Fedde* reports it also from Northern and Central Asia Minor, Armenia and Northern Persia (Teheran). Specimens in the Kew Herbarium marked "Turcomania" point to an

even farther eastward extension of its range. How far it is really native in the outlying parts of the area adumbrated above, we cannot say, but so much seems to be certain that it does not spread so readily as the poppy of our cornfields, the only records of it as an alien in Europe being those of Borbas (1878) and Reinecke (1900), who observed it near Budapest and at Ilversgehofen near Erfurt respectively.* In this country it was first brought to the notice of the gardener by W. Thompson, a nurseryman of Ipswich, who, in 1876, sent specimens which he had raised from seed received from St. Petersburg to the "Gardeners' Chronicle." Subsequently an editorial note in the same journal (of August 22nd, 1880) called attention to this plant than which "scarcely anything can be more brilliant in hue," whilst two years later Professor L. Wittmack, of Berlin, gave a very thorough account of it, accompanied by a good coloured plate in the *Deutsche Gartenzeitung* (Vol. I. 299). The plant, however, had been in cultivation before that, as seeds of it were distributed by the Petersburg Botanic Garden as early as 1837, the year when the species was first described, and again later on, as in 1843, 1845, 1846 and 1858, and it was grown in Vilmorin's nurseries at Verrières in 1860. Vilmorin also mentions it in the first edition of his *Fleurs de Pleine Terre* (1863). In St. Petersburg and at Verrières the poppy was known as *P. commutatum*, but in 1873, and again in 1875, a poppy said to have been collected in the Caucasus appeared in the seedlist of the St. Petersburg Garden† under the name *P. umbrosum*. It was from seed of this origin and under this name that Thompson introduced the poppy into English gardens in 1876. How and where the name "*umbrosum*" arose is uncertain. Regel, who was then in charge of the Botanic Garden at St. Petersburg, told Wittmack merely that the poppy had been received there under that name, and that it was identical with *P. commutatum*. The name *P. umbrosum* was subsequently taken up in such compendia of horticultural literature as Nicholson's *Dictionary of Gardening* and the later editions of Vilmorin's *Fleurs de Pleine Terre*, but it

* Schur's record (1866) for Hermannstadt in Transylvania is evidently incorrect and Simonkai refers Schur's plant to *P. strigosum*.

† I have not seen this particular seedlist, and rely in this instance on Thompson's statement as quoted by Wittmack.

was ignored in the more strictly botanical literature. Colour varieties (petals verging to orange or almost white) and doubles have arisen in cultivation, but otherwise the species has remained unchanged in all its essential characters.

The appressed hairs of the flower stalk distinguish our poppy very readily from *P. Rhoeas*, but the discrimination between it and *P. strigosum* is more difficult. However, the stipitate base of the ovary or the capsule and the so conspicuously blotched petals of *P. commutatum* may generally be relied upon as distinctive characters. The first of these two characters was overlooked until Fedde, in his monograph of the *Papaveraceae*, pointed it out, and owing to this oversight most of the Caucasian material assigned by Busch to *P. strigosum* belongs probably to our plant. *P. strigosum* seems indeed to be rather an East-Mediterranean plant (Asia Minor, Egypt, Greece, etc.) which has long ago established itself in various parts of Southern and Central Europe as a more or less regularly recurrent alien.

P. commutatum is as easy to grow as our common poppy (*P. Rhoeas*), and in good soil and if sown in the autumn, it will form copiously branched bushes which go on flowering for a long time, but, if sown in the spring, little good seed may be formed and the plant may be lost. The double form may be seen in flower from May to September, particularly if the flowers are cut as soon as the petals have fallen. Like other annual poppies, *P. commutatum* requires some care if the seedlings are picked and planted out; they have to be taken up with a fair amount of soil around the roots, and it is therefore best to sow them directly where they are wanted. If grown in large groups, the effect of the sheets of crimson flowers is superb. The present plate was prepared from specimens grown at Kew, where the poppy has been in cultivation for many years.

DESCRIPTION.—An *annual herb* of the habit of *P. Rhoeas*, usually 30-50 cm. high, in the wild state sparingly branched with loosely bristly axes, the bristles *fine, white, up to 3 mm. long*, spreading in the lower parts, but *shorter and appressed and upright higher up, particularly on the flower stalks*. Leaves sessile or, the lower, stalked, pinnatifid to coarsely lobed or toothed, the lower up to over 15 cm. by 8 cm., mostly

sparingly hairy or bristly, especially on the midrib and the margins, bright green to glaucous; pinnae 3–5 on each side, ovate oblong or obovate-lanceolate in outline, 3·5 cm. long by 1·5 cm. to 0·75 cm. or more or less reduced to sparsely toothed or entire lobes, lobes or teeth acute or obtuse. *Flower-stalks* up to 30 cm. long, nodding in the bud, then erect. *Sepals* up to over 2 cm. long, loosely bristly. *Petals* rotundate-obovate, up to 4 cm. by 5 cm., brilliantly crimson or vermilion, *with a large obovate black blotch well above the base*. *Stamens* purplish-black; filaments up to 8 mm. long; pollen greenish. *Ovary much constricted at the base and shortly stipitate*, obovoid-turbinate or almost semi-globose, glaucous, 8–10 mm. by 6–8 mm.; stigmatic disc slightly umbonate, 5–10-crenate, crenae overlapping. *Mature capsule* more or less semiglobose, 10–12 mm. wide and almost or quite as high, the crenae of the disc at length discrete.

DISTRIBUTION.—Caucasus and adjoining countries, up to 2,000 m.

O.S.

Fig. 1, stem with buds, nat. size; 2, a flower, nat. size; 3, a lower leaf, nat. size; 4, a stamen, $\times 10$; 5, a capsule, nat. size; 6, stigmatic disc, $\times 3$; 7, section through ovary, $\times 3$.



TAB. 9092.

GERANIUM FARRERI.

China.

GERANIACEAE. Tribe GERANIEAE.

GERANIUM, Linn.; *Benth. & Hook. f., Gen. Plant.* I. 272; *Reiche in Engl. & Prantl, Nat. Pflanzenf.* III. 4. 28; *Knuth in Engl., Pflanzenreich*, IV. 129. 43.

Geranium Farreri, *Stapf. (sp. nov.)*; proximum *G. Pylzowiano*, Max., et *G. napuligero*, Franch., sed ab illo differt rhizomate praemorso radices subcylindricos crassos carnosos emittente, foliis brevius et pro rata latius lobulatis, ab hoc radicibus carnosis permulto longioribus, foliis calycibusque laxe pilosis et inter pilos glandulosis, ab utroque filamentis praeter basin ciliolatam epilosis.

Syn. *G. Pylzowianum* var. *alpinum*, Farrer, *On the Eaves of the World*, II. 321 (1917).

It is always a pleasure to quote Farrer, when it is a question of visualising vividly the natural setting of a plant which in one way or the other has struck the eager and keen eye of this supreme enthusiast. This is how in his "On the Eaves of the World" (II. pp. 172, 173) he describes the *Geranium*, which is the subject of the present plate. "It was not, however, till I attained the actual crest* that I saw the *Geranium* down below in a waste of russet stone . . . all the wilderness of shingle and scree was tufted and carpet-bedded with this new treasure . . . the *Geranium* fills the whole stage with its profusion of large and very pale pink flowers springing all over the close and matted tufts that ramify through the shingle . . . turning the gaunt shingles at twelve thousand feet to a crowded dance of its faintly blushing blossoms, silvery in the cold, pale air that day I saw it, and dense upon the concise and comely clumps. . . . It is said by some to be a mere form of *P. Pylzowianum* from the meadows below—an opinion from which I at present dissent on many grounds, and not least on account of the marked differences of the two plants in their seedling stages. *G. Pylzowianum* abounds also in the alpine fields of the Da Tung Chain† But nowhere in those parts could I ever come across this high mountain species. . . ." In the Index the *Geranium* is referred to as "*Geranium* (?) F. 201," and in the Botanical Appendix as *Geranium* (?)

* He is speaking of the crest of the Red Ridge above Ardjeri in the Min shan, which he visited in the first days of August, 1914. Purdom had previously found the *Geranium* there.

† The mountain range between the Tatung river and Siningfu (Tsing shi tung of maps).

Pylzowianum var. *alpinum* (F. 201). In his earlier report of work in 1914 in Kansu and Tibet (Journ. Roy. Hort. Soc. XLII., 76, 1916), however, No. 201 is put down simply as *G. Pylzowianum*. Here he says of it—I quote only as far as additional information accrues:—"F. 201 . . . a high-alpine species, found only in the top-most screes of shale or limestone at 13,000–15,000 feet, where it abounds in such masses as to cover the whole vast expanse of desolation with the fluttering flights of its innumerable big flowers of palest pink in August crowded on footstalks of 2–3 inches . . . its season is so awkward that it was only after great difficulty and exertion that two seeds were hacked up out of the ice-locked adamant of the mountain in autumn." Whether those two seeds ever gave rise to plants that were distributed, I do not know. *G. Pylzowianum* pure and simple, on the other hand, was connected in the Appendix with the number F. 170, and referred to in the text of his book (II. 128) as "a big rose-pink *Geranium* running about in the finer turf on the finest of threadlike stems." Seeds of that number were distributed freely—whence exactly they were derived is not quite certain—and these have given rise at Kew to two distinct plants, one with slender rhizomes thickened at intervals into tuber-like swellings covered with scale-leaves and the vestiges of leaf-bases and emitting fine fibrillous roots, with narrowly dissected leaves and with flowers whose filaments are distinctly though loosely hairy to or beyond the middle, another with a short premorse rhizome and stouter and in part fleshy and much thickened roots (see fig. 2 of our plate), with leaves whose ultimate lobings are short and broad or altogether of the nature of crenae, and with filaments glabrous above the widened ovate and ciliolate base. Only the first agrees with *G. Pylzowianum*, as originally described by Maximowicz from specimens collected by Przewalsky in the Tatung Alps. It was introduced into cultivation by Veitch & Sons through Mr. Purdom, who obtained it in the Taipei shan (Tsin ling range) in Shensi. It is also known from Western Szechuan (Tachienlu and Tongolo), and has therefore a wide range. Most of the field specimens of *G. Pylzowianum* are not much taller than Farrer's plant from the Min shan, but plants raised from seed collected by Purdom have grown up to over 30 cm. high with leaves over 5 cm. wide. The second form

is the plant figured here. It has not been recorded so far from anywhere, unless Giraldi's specimens from Shensi, quoted by Knuth in the *Pflanzenreich* under *G. napuligerum*, belong to it. A good photograph of a flowering clump of it may be found in the "Gardeners' Chronicle" for November 26th, 1921, under the name *G. Pylzowianum*. Although the leaves are mostly out of focus, the short ultimate lobules or crenae of Farrer's plant can clearly be seen. It may fitly be dedicated to its discoverer. As to the original *G. napuligerum* of Franchet, this is a plant with very small fleshy fascicled roots (5-7 mm. by 2.5-3 mm.), leaves densely greyish, hairy on the back and glabrous on the face, more densely (sometimes silvery) hairy sepals, obovate petals (10 mm. by 6-7 mm.) and long-haired filaments. I know it only from Delavay's original from the Yen-tze-hay Pass above Langkong north of Tali (No. 2328). Forrest (Nos. 6198, 6420) and Schneider (Nos. 1869, 1938) collected in the Lichiang range a plant similar to *G. Farreri*, but with more richly coloured (deep-rose) flowers and with a long creeping uniformly slender rhizome, more or less covered with the vestiges of scale-leaves and leaf-bases. This is the plant from Yunnan referred to under *G. Pylzowianum* in the "Gardeners' Chronicle" (l.c.) and enumerated under the same name in the Edinburgh Botanical Notes (VII. 149, 1912). It may conveniently be called after its discoverer, *G. Forrestii*. It is very similar to Knuth's (not Sweet's) *G. Donianum* from Sikkin, which differs mainly in having a short premorse rootstock with somewhat fleshy root-fibres (up to 2 mm. in diameter in the dry state), a slightly coarser hair-covering, broad hyaline margins to the sepals and hairy filaments, and this I propose to name *G. stenorrhizum*. All these species (*G. Pylzowianum*, *G. Farreri*, *G. napuligerum*, *G. Forrestii* and *G. stenorrhizum*) form a very natural group, whose differentiation rests mainly on the development of the underground parts (rhizome and roots), whilst in foliage, flowers and fruits, they are indeed so similar that some might be inclined to treat them merely as geographical races. I may add that the rhizome and root-structures of the three species, which are in cultivation (*G. Pylzowianum*, *G. Farreri* and *G. Forrestii*), have so far remained unchanged. All of these species are worth a place in the rock- or moraine-garden. In any case they

will do best in a poor and shingly soil where they can be kept low and will flower freely, whereas in rich ground they are apt to become somewhat rank. As they all come from high altitudes, they are, of course, perfectly hardy. The specimen depicted here was grown at Kew in a pot in a cool frame, with the result that the stems were more drawn up than is the case under natural conditions; others planted out in the rock-garden formed dense low cushions.

DESCRIPTION.—A low perennial herb; *rhizome short with partly fleshy cylindrical roots* (see fig. 2), *the fleshy portions up to over 3 cm. by 7 mm.*, throwing up short or somewhat elongate (up to 15 cm.), sparingly branched, slender, erect or more usually decumbent stems, which, like *most other parts of the plant, are slightly and finely downy*, the hairs of the axes and leaf-stalks being reflexed (see fig. 3). *Leaves* opposite, the lowest borne on very long (15 cm.), the upper on shorter stalks; blades reniform in outline, 3–5-fid, *with the segments obovate-cuneate and coarsely crenate or 3-lobed, the whole blade 2–1.5 cm. by 2–2.5 cm.*, bright green, *loosely and appressedly hairy and microscopically glandular*; stipules free, ovate, apiculate, purple, 2–3 mm. long. *Flowers* mostly 2-nate, the pair borne on long (5–10 cm.) slender peduncles; bracts resembling the stipules; pedicels 2–4 cm. long, horizontal or deflexed at maturity. *Sepals* (fig. 4) oblong, apiculate, up to 8 mm. by 2–3 mm., *almost glabrous, green with a hyaline, downy white or pink margin* (fig. 4). *Petals* (fig. 5) rotundate from a short, wedge-shaped, shortly bearded claw, up to 1.8 cm. by 1.4 cm., *pale rose or lilac*. *Disc-glands* as in figs. 6 and 8. *Filaments* gradually attenuated from an ovate finely ciliate base, glabrous above it (fig. 7); anthers dark, bluish-purple with white pollen. *Carpels* (fig. 8), like the style-base, densely tomentose; style, 6–7 mm. long; stigmatic branches 5, spreading with recurved tips. *Mature carpels* borne on a column, 1.5 cm. long, as in fig. 9, glabrate. *Seed* (as in fig. 10) smooth, microscopically pitted.

DISTRIBUTION.—China; Min-shan on the border of Kansu and Szechuan, 3,900–4,500 m. O.S.

Fig. 1, a flowering stem, nat. size; 2, rhizome and roots, nat. size; 3, a portion of a stem, $\times 3$; 4, a sepal, $\times 3$; 5, a petal, $\times 2$ (the ciliae of the claw omitted); 6, a young flower, with sepals and petals removed; 7, a stamen, $\times 3$; 8, a pistil, $\times 3$; 9, a mature fruit, $\times 3$; 10, a seed, $\times 6$.



TAB. 9093.

ACTINIDIA KOLOMIKTA.

East Asia.

THEACEAE. Tribe SAURAUIEAE.

ACTINIDIA, Lindl.; *Benth. & Hook. f., Gen. Plant. I.* 184; *Gilg in Engl. & Prantl, Nat. Pflanzenf. III.* 6, 125.

Actinidia kolomikta, Max., *Prim. Fl. Amur.* 63 (1859); simillima *A. polygamae*, Max. (haud *A. polygamae*, Bot. Mag. t. 7497, quae *A. arguta*, Miq., est) et cum ea saepe confusa, sed ramorum medulla transverse lamellata (nec continua), foliis minime setulosis, floribus minoribus et gracilius pedicellatis, ovario subgloboso vel breviter lateque cylindrico distincta.—Carrière in *Rev. Hort.* 1872, 395, fig. 43; Masters in *Gard. Chron.* XIV. 262 (1880); Regel in *Gartenfl.* 1880, 184 c. fig.; Max. in *Bull. Ac. Sc. Petersb.* XXXI. 19 (1886) et *Mél. Biol.* XII. 424 (1886); Hemsley in *Journ. Linn. Soc.* XXIII. 78 (1886); Graebner in *Gartenfl.* 1894, 78; André in *Rev. Hort.* 1898, 36 c. tab.; Diels in *Engl. Bot. Jahrb.* XXXVI. Beih. 82, 76 (1905); Komarow in *Act. Hort. Petr.* XXV. 36 (1905); C. Schneid., *Ill. Handb. Laubholzk.* II. 327, figs. 216 d-e (1909); Nakai in *Journ. Coll. Sci. Tokyo* XXVI. 98 (1909); Dunn in *Journ. Linn. Soc.* XXXIX. 404 (1911); Matsumura, *Ind. Pl. Jap.* II. 356 (1912); Rehd. in *Sarg., Pl. Wilson.* II. 380 (1916) et in *Bailey, Stand. Cycl. Gard.* I. 213 (1914); Bean, *Trees and Shrubs*, ed. 3, 163 (1921); Kudo in *Journ. Coll. Agr. Hokkaido Sapporo*, XII. I. 46 (1923).

Syn.: *A. callosa*, Benth. in *Journ. Linn. Soc.* V. 55 (1861) quoad plantam Manchuriae. *A. platyphylla*, A. Gray in Miq., *Prol. Fl. Jap.* 203 (1866-1867); Franch. et Sav., *Enum. Pl. Jap.* I. 58 (1875).

Prunus ? *kolomikta*, Max. in *Bull. Phys.-Math. Acad. Petersb.* XV. 129 (1856).

Kalomikta mandshurica, Reg. *ibid.* 219 (1857).

Trochostigma kolomikta, Rupr. *ibid.* 261 (1857).

Actinidia kolomikta is a northern member of a large tropical and subtropical group which has adapted itself to the rigours of the East Siberian climate and become a prominent element in the forests of the Amur-region from the valleys of the Lesser Khingan mountains (about 128° E.) to the lower reaches of the river at 52° 40' N. It is essentially a shade-plant, climbing in trees, deciduous as well as ever-green (conifers), by means of adventitious roots in the lower parts and by the twining of long whip-like shoots higher up, or rambling after the fashion of brambles over the undergrowth or, in clearings, trailing on the ground; and so dense are, according to Radde, the kolomikta-thickets on the middle Amur that the forest becomes almost impenetrable. It is on the edges of these forests or in the tops of high trees that the foliage of the kolomikta, otherwise of a rich deep green, assumes that peculiar colouring which makes the plant so striking an object of beauty. There under the influence of a stronger light the development of chlorophyll

is, to a varying degree, arrested in the upper cell-layers of the leaves, so that these become more or less silvery white, and as anthocyanin is often formed at the same time, flushes of pink or raspberry-red are worked into the silver-patterns. The underside of the leaves, however, always retains its uniform normal green. Later on, when the leaves are matured, chlorophyll may develop also in the upper cell-layers with the result that the variegation becomes subdued or disappears altogether. *A. kolomikta* ranges from the Amur eastwards to the Gulf of Tartary and the Sea of Japan and beyond them to Saghalin (to 50° N.), Yezo and Hondo, whilst southwards it extends to Korea and Southern Manchuria. A second area lies farther south in Central Szechuan.* Here, too, it is a common climber in the woods and on cliffs or a straggler in the undergrowth "with white fragrant flowers and added beauty in the shape of a multitude of white leaves" (Wilson). In the northern section of its area, it was, in 1885, discovered by Leopold von Schrenk and by Maximowicz on the lower Amur, and almost simultaneously by J. Small, Charles Wright's assistant on the United States North Pacific Expedition, in Yezo. It was first introduced into European gardens as it seems from Japan to France previous to 1872 and to England in 1877 when Charles Maries sent seed of the "cat plant"† of Japan to Messrs. Veitch. As might be expected *A. kolomikta* is absolutely hardy in this country. It has here and on the continent withstood the severest winters; in fact, Regel has already pointed out long ago that it does well in the open even at Petersburg. It may be propagated from cuttings made from the half-ripe wood in the early summer or by layering or from seed and it will put up almost with any soil. Mr. Rehder, in Bailey's Standard Cyclopaedia, says that it is generally only the male

* The Hupeh plant referred by Mr. Dunn to *A. kolomikta* (Henry Nos. 1788, 4075, 5922) is the Chinese form (*f. laevis*) of *A. polygama*, characterised by the almost entire absence of the small soft bristles found on the leaves of its Japanese counterpart. Giraldi is said to have collected *A. kolomikta* in numerous places in the Tsinling Shan (Shensi). I have not seen his specimens, but the actinidia which Purdom (No. 891) collected in the same region is also *A. polygama f. laevis*.

† The name "cat-plant" or "herbe aux chats" refers to the peculiar attraction which *A. kolomikta* and other species of the genus excite in cats. Ito tells us that cats eat eagerly the branches and leaves and rub their bodies on the plants. When charcoal-fagots are tied up with actinidia-twigs and burnt, cats will follow the scent from afar and congregate round the fire, roll on their backs with saliva running freely from their mouths and they will altogether behave as if mad. For the same reason cats have been found a nuisance in European and American gardens where actinidias are grown and the plants had in some instances to be protected by wire-netting.

plant which exhibits the exquisite phenomenon of variegation described above. André and others in describing the variegated plant also state that they have not seen it to produce fruit, and my own experience, including herbarium material from widely distant localities, tends to confirm Rehder's observation. On the other hand female plants in the arboretum of the Vienna High School of Agriculture are recorded to have produced white leaves which turned eventually red ; nor do the collectors' scanty field notes suggest any sexual proclivities in this direction. However, if such existed it might explain the fact that female plants are so much rarer in gardens than males, *A. kolomikta* having been grown so far chiefly for its decorative effect. It should, however, be kept in mind that it is also of considerable value as a fruit-shrub.* The fruits, which resemble fair-sized somewhat oblong gooseberries (hence called Amur-gooseberries in Siberia), are much valued by the Russian colonists and the natives on the Amur for their pleasant acid taste and they are stated to become very sweet when touched by frost. Graebner (*l. c.*) says they are produced in great quantity at Potsdam and might profitably be used for confectionery, jellies and wine ; they would, in the fresh state, no doubt also make a pleasant table-fruit.

The synonymy quoted above requires no comment as it is generally agreed upon ; nor is there any difficulty in discriminating between our plant and its congeners, from which it differs in its glabrous shoots in combination with its thin, mostly cordate leaves, glabrous except for some short reddish down along the midrib, its glabrous shortly cylindric or hemispheric ovaries (whether fertile or barren) and its unspotted fruits. The position, on the other hand, of *Actinidia* as a genus in the system is still debatable. It has been placed by some in *Theaceae* (*Ternstroemiaceae*) and by others in *Dilleniaceae*. It is, like the Chinese *Clematoclethra*, undoubtedly closely allied to the large genus *Saurauia* (see Bot. Mag. t. 3982), from which it differs mainly in the placentation of the ovules, and it is a question worth considering whether it should not be grouped with *Saurauia* in a separate family, co-ordinate rather with, than subordinate to, *Theaceae*.

* An interesting article by Dr. Fairchild on actinidias as fruit-plants may be found in Circular 110 of the Bureau of Plant Industry, U.S.A. Dep. of Agriculture.

The specimen depicted here, a part of a male plant, was kindly communicated by Mr. G. W. E. Loder, of Wakehurst Place, Ardingly, Haywards Heath, where it flowered in June, 1924.

DESCRIPTION.—A tall, almost glabrous, dioecious (see below) *climber* or rambling *shrub*; *branches with chambered pith*. *Leaves* borne on slender stalks up to 5 cm. long, ovate to ovate-oblong or almost elliptic from a broad *often shallowly cordate base*, *finely and simply or doubly toothed* with the teeth often produced into short cylindric water-glands, 8 to over 10 cm. by 4 to 7 cm., thin, green, often variegated on the upper side with white and red and pink or quite white or pink, glabrous when young but for a short scanty reddish down on the midrib and main-nerves (about 6 on each side). *Flowers* unisexual, male or appearing as if hermaphrodite, but functionally female, solitary or in 2- to 3-flowered racemes, from the axils of leaves or extra-axillary, particularly at the base of the spurs, fragrant, nodding; *pedicels filiform* or, of the male flowers, *almost capillary*, 7 to 10 mm. long. *Sepals* 4 or 5, rarely more, elliptic-oblong, blunt, finely downy towards the margins, about 5 mm. long, persistent. *Petals* 5, sub-orbicular, white, *about 8 to 9 mm. long*. *Stamens* up to over 20; filaments and anthers as in Fig. 5, the latter yellow; pollen of the pseudo-hermaphrodite flowers effete. *Ovary* glabrous, *shortly and stoutly cylindric in the male flower with rudimentary point-like styles* (Fig. 3) and with 10 to 15 empty cells (Fig. 6), *in the pseudo-hermaphrodite (female) flowers semi-globose* with 12 to 15 filiform spreading or recurved persistent styles, 4 mm. long, with slightly thickened stigmatic tips; cells many-ovuled. *Fruit* an oblong-ellipsoid juicy berry, *up to 1.7 by 1 cm.*, green, with 10 or more, darker longitudinal lines, smooth, drying black. *Seeds* oblong, 2 to 2.5 mm. long, oblong, yellowish; testa finely pitted.

DISTRIBUTION.—Lower and middle Amurland, Manchuria, Korea, Japan and West- and Central-Szechuan, here from 1,500 to 2,700 m.

O. S.

Fig. 1, a flowering male branch, nat. size; 2, a portion of a leaf, face view, $\times 8$; 3, a calyx with a barren ovary, $\times 6$; 4, a petal, $\times 3$; 5, stamens of a male flower, front and back-view, $\times 6$; 6, section through a barren ovary, $\times 4$.



L. Snelling del. et lith.

TAB. 9094.

SPIRANTHES PAMII.

Argentina.

ORCHIDACEAE. Tribe NEOTTIAE.

SPIRANTHES, L. C. Rich.; *Benth. & Hook. f., Gen. Plant.* III. 596; *Pfitzer in Engl. & Prantl, Nat. Pflanzenf.* II. 6. 113.

Spiranthes Pamii, *Braid in Kew Bull.* 1924, 204; *S. alpestri*, Rodr., proxima, sed foliis patentibus elliptico-oblongis pro rata latioribus basi magis contractis et labelli epichilio transverse oblongo-quadrato leviter trilobo distincta.

Syn. : *S. lineata*, Stuckert in An. Mus. Nac. Buenos Aires, IX. 12 (1903), non Lindl.

S. elata var. *ovata*, Cogn. in Mart. Flor. Bras. III. IV. 192 (1895), quoad specimina Argentinae.

Spiranthes Pamii was in 1923 described by Professor K. W. Braid, then a member of the Herbarium Staff at Kew, from a large batch of specimens which had been raised at the Royal Botanic Gardens from a consignment of root-tubers, communicated by Major A. Pam of Wormley Bury, Broxbourne, Herts. These tubers, the Major informs me, had been obtained by his collector, Herr Kozel, in the northern part of the Province of Tucuman, Argentina.* The species was, however, already in cultivation at Kew more than twenty years ago, and this earlier introduction was, as far as can be ascertained at present, due to Señor Teodoro Stuckert of Cordoba, Argentina, who at that time corresponded with Kew concerning the identity of the plant. He recorded it subsequently (1905) under the name *S. lineata*, Lindl., which is clearly a mistake, as Lindley's plant of that name has glabrous flowers with a relatively large, apically rotundate, ovate and densely papillose epichile. This so-called *S. lineata* was found growing in great numbers under an immense algarrobo (*Prosopis alba*) on the estate San Teodoro in the Department Rio I. of Cordoba. Major Pam's specimens from northern Tucuman mark therefore an extension of the range of our species of over 500 km. northwards. A further increase of area is indicated by the inclusion of the Argentine localities, quoted by Cogniaux for his variety *ovata* of *S. elata*.† These localities are situated

* Braid's statement in the Kew Bulletin that the plant came from Buenos Aires is due to a misunderstanding.

† We are indebted for the loan of the specimens quoted by Cogniaux to Professor L. Diels, the Director of the Botanic Garden and Botanic Museum at Dahlem, Berlin.

in Tucuman, Salta and Oran and they carry therefore the area of *S. Pamii* another 500 km. farther north, that is, close to the Bolivian frontier. The Brazilian specimens referred to *S. elata* var. *ovata* belong in my opinion to *S. alpestris*, of which there is at Kew a fine coloured drawing, a copy of Barbosa Rodriguez's original picture of the species. *S. elata* itself is an essentially West Indian species with broad leaf-blades tapering shortly to a rather wide leaf-stalk and with a lip which might be described as spatulate in outline whilst that of our plant is hammer-shaped. This shape of the lip is well shown in Jacquin's figure of the synonymous *Neottia minor* (Ic. Plant. Rar. t. 602) and in that of t. 2026 of the Botanical Magazine (as *N. elata*). As to *S. alpestris* with which our plant has been compared, this has relatively longer leaves which are very gradually attenuated at the base and more upright in their natural position whilst the epichile is very similar to that of *S. Pamii*, but on the whole less angular with a wavy rather than shallowly 3-lobed front. It became first known from the mountains of Minas Geraes, although it had been long before collected on Mt. Corcovado near Rio (Tweedie; Gardner 843; Miers). It has since been recorded from S. Paulo and even from Paraguay, and a specimen collected by Hassler in Central Paraguay (No. 3221) and distributed as *S. sellilabris* may indeed belong to it. Cogniaux also cites *S. elata* var. *ovata* from Peru and Bolivia, but the material I have seen under that name from these countries belongs certainly neither to *S. elata* nor to *S. alpestris* nor to *S. Pamii*.

S. Pamii has so far been treated at Kew as a stove plant in an intermediate house, but to judge from the physical conditions of its natural habitats, it may be safely assumed that an ordinary greenhouse with conditions suitable for Australian or Cape plants would answer as well. Herr Kozel says it requires dry and sandy soil, and although it ought to be watered well, whilst it prepares for flowering and during flowering, it needs to be kept dry afterwards. In Argentina the time of flowering is our autumn and early winter. In this country, however, flowering is delayed and does not set in until January, continuing to late in March.

Professor Braid distinguished among the plants raised at Kew from Major Pam's introduction three varieties according

to the colouring, the degree of the dorsiventrality of the spikes—they are sometimes scarcely secund—and the length of the petiole. In my opinion all these variations are of the nature of ordinary fluctuation and can hardly be depended upon. The two colour-variations mentioned by him are, however, shown in our plate, the green and white spike representing the usual or typical form, the other his variety *brunneola*. It is due to an unusual development of anthocyanin which in combination with the chlorophyll produces a brownish tint.

DESCRIPTION.—A terrestrial *perennial* with bundles of very hairy fleshy cylindrical roots, up to 7 cm. by 1.2 cm., producing a tuft of basal leaves and flowering scapes, 15–30 cm. high. *Scapes* glabrous up to $\frac{1}{3}$ or $\frac{2}{3}$ of its length with 4 or 5 distant membranous green or reddish-brown sheathing scale-leaves, with long slender points and up to 3 cm. long. *Leaves* about 5 in a tuft; blades spreading, borne on obliquely erect or ascending channelled stalks, short or the longest up to 5 cm. long, *elliptic-oblong*, rather *suddenly contracted at the base when flattened out*, otherwise *appearing to taper downwards more gradually owing to the folding of the blade-base*, acute or subacuminate, 5–10 cm. by 2.5–5 cm., glabrous, green. *Raceme* spike-like, many-flowered, secund or subsecund, 10–25 cm. long, erect; rhachis hairy like the upper part of the scape, but more densely; bracts lanceolate-subulate, acuminate, hyaline, 1–3-nerved, the intermediate 11–12 mm. long, green or suffused with red. *Flowers* subsessile, spreading or nodding on the curved glandular-pubescent receptacle; this 3–4 mm. long. *Sepals* glandular-pubescent from the middle downwards or lower down, gibbous at the base, green all over or reddish upwards, the posticous narrowly obovate-oblong, very convex in the middle, with the tip recurved, 5–6 mm. by 2–2.5 mm.; the lateral linear, slightly falcate, blunt, 8 mm. by 1 m. *Petals* linear, tapering basewards, very blunt, very slightly shorter than the posticous sepal and tightly adhering to it by the inner margin, up to 1.25 mm. wide upwards. *Lip* hammer-shaped; claw 5–7 mm. long, clasping the column and upwards adhering to it for a short distance, widened at the base, with short horn-shaped processes inside, constricted below the points of attachment to the column

and again very slightly higher up, with two ill-defined calli at the level of the rostellum, very minutely papillose in the channel below and above the calli, outside green or brown-green below the middle and white above, inside with 5 greenish lines in the lower half, the middle one continued into the epichile; *epichile transversely oblong-quadrate*, 2 mm. by 4 mm., *slightly concave, very shallowly 3-lobed in front*, white. *Column* rather slender, widened upwards, over 2 mm. long, very minutely and sparingly pubescent on the face. *Rostellum* ovate, acuminate. *Anther* 2.5 mm. long. *Pollinia* clavate, 2 mm. long. *Capsule* obovoid, 6–7 mm. by 3.5 mm.

DISTRIBUTION.—Western Argentina from Cordoba to Oran near the Bolivian frontier.

O. S.

Fig. 1, a plant (typical form) without the roots, nat. size; 2, an inflorescence of f. *brunneola*, nat. size; 3, a flower in side view, $\times 3$; 4, a flower in front view, $\times 4$; 5, a longitudinal section through the base of the lip and the column showing one of the horn-shaped appendages of the lip, $\times 8$; 6, column, stamen and base of lip (sides of the latter pulled apart to expose the column), $\times 15$; 7, column with rostellum and pollinium $\times 5$; 8, pollinium, $\times 10$.



TAB. 9095.

RHODODENDRON SALUENENSE.

China.

ERICACEAE. Tribe RHODODENDREAE.

RHODODENDRON, Linn.; *Benth. & Hook. f., Gen. Plant.* II. 599; *Drude in Engl. & Prantl, Nat. Pflanzenf.* IV. I. 35.

Rhododendron saluenense, *Franch. in Journ. de Bot.* XII. 263 (1898); inter species elatiores gregis *Saluenensium* ramis copiose et diu setosis atque corollis subrotatis maiusculis exsiccando purpureo-coeruleis (haud albicantibus) distincta (vide caeterum infra).—Hemsley in *Journ. Linn. Soc.* XXXVI. 569 (1905); Diels in *Not. Bot. Gard. Edinb.* VII. 40 (1912); Millais, *Rhod.* 238 (1917); ed. 2, 228 (1924); Wilding, *Rhod.*, 84 (1923):

Syn.: *Rhododendron chameunum*, Balf. & Forrest in *Not. Bot. Gard. Edinb.* XIII. 37 (1920).

R. humicola, Wilding, *Rhod.* 47 (1923), nomen.

R. sericocalyx, Wilding, l. c., 87, nomen.

R. colobodes, *Rhod. Soc., List Rhod. in their series*, 23 (1925), nomen.

When writing in this Magazine (t. 9001) of *Rhododendron calostrotum* and its fellow members of the *saluenense*-group I said that the affinities of this group “are so close as to be bewildering, and one wonders how the tangled skein of forms will be unravelled.” The present plate and the accompanying text may be acceptable as a contribution towards the problem, because *R. saluenense* is the first member of the group to be known, and because it is now, owing to recent accretions of field-specimens, well represented in the collections at Kew and Edinburgh. *R. saluenense* was discovered by the Abbé Soulié in 1894 at Dong in an eastern tributary valley of the Upper Mekong (24° 40' N.) and on the Sie-la (Séla of Franchet), a pass in the Mekong-Salween divide about 60 km. farther south (28° 3' N.). It was in 1898 described by Franchet who compared it with *R. dendrocharis*, a species of Central Szechuan. To-day we know that the latter cannot any longer be considered as belonging to the “series” of which *R. saluenense* is the prototype. Subsequently, that is between 1914 and 1921, G. Forrest collected ample material of a rhododendron of the same type as *R. saluenense*, partly within the area of that species, partly farther south on the Litiping plateau between the Mekong and the Yangtse (27° 12' N.) and in the mountains of Muli in Southern Szechuan (28° 12' N.). The Litiping specimens were described (1920) by Sir Isaac Bailey Balfour and Forrest as *R. chamaeunum* (Forrest No. 13904), whilst others were

distributed, but not described, under such names as *R. humicola* (No. 19172) from the Salween-Irawaddy divide (28° 40' N. ; 98° 15' E.), *R. sericocalyx* (No. 16449) from Muli and *R. colobodes* (No. 13383) from the Mekong-Salween watershed. With good material before me, I may say confidently that the specimens representing these "species" are so much alike that if they were thrown together and shuffled, they could not be resorted again with a reasonable degree of certainty. Nor can I detect any tangible difference between them and Franchet's original *R. saluenense*. Of the other species referred to the *saluenense*-series, *R. cosmetum* (Forr. No. 13985) with its synonym *R. pamprotum* (Forr. No. 14043; nomen) evidently approaches most closely to our *R. saluenense*. It may be recognised by its general lighter colouring, its scaly almost bristleless stems, its on the whole narrower, often acute and almost quite glabrous calyx segments (excepting the marginal ciliae) and its smaller, more bowl-shaped flowers which when fully open turn white on drying. *R. cosmetum* was found first in 1917 on the Bei-ma shan in the Mekong-Yangtse divide in 28° 12' N. and farther southeast on the Chungtien plateau in 27° 40' N. I might in this place also mention *R. amaurophyllum*, Balf. f. & Forr., collected by Forrest in the Salween-Kui-chiang divide (28° 40' N. ; 98° 15' E.), as an imperfectly known species, entirely of the facies of *R. saluenense*, but with bristleless or almost bristleless branches and bristleless flower-stalks, both covered with loosely appressed or very shortly stipitate scales. All the flowers I have seen of this form were abnormal, so that it is impossible to place it correctly at present. It is most likely a diseased condition of *R. saluenense*, which indeed has been collected by Forrest in the same locality. The remainder of the *saluenense*-group consists of dwarf prostrate shrubs, 2.5–15 cm. high, whose annual growths are very short and bear almost rosulate leaves. Here belong *R. prostratum*, W. W. Smith (Bot. Mag. t. 8747), *R. charidotes*, Balf. f. & Farrer, *R. calostrotum*, Balf. f. (Bot. Mag. t. 9001), *R. humifusum*, Balf. f. & Ward, *R. Keletianum*, Balf. f. & Forrest and *R. radicans* Balf. f. & Forrest. The area of the *saluenense*-group is confined to the high mountains of Western Yunnan (from 28° 40' N.) and the adjoining ranges of Burma (here *R. charidotes* and *R. calostrotum*). *R. saluenense* itself inhabits stony, often moist, pastures and

meadows or cliffs and boulders from 3600–4200 m. within an area roughly bounded by 28° 40' N. and 27° N., and by 98° E. and 99° E. Forrest describes it in his field-notes as a small shrub, 20–60 cm. high, with purple flowers often verging to rose or crimson. We are indebted to the Marquis of Headfort for the material from which the plate was prepared. He grew it from seed, collected by Forrest, in the open in his garden at Headfort, Kells, Ireland, where it flowered for the first time towards the end of April 1924. It is, of course, perfectly hardy.

DESCRIPTION.—A small much branched *shrub*, up to 60 cm. high; the young branches green or reddish *with scattered rufous bristles* and sessile scales. *Leaves* shortly stalked; blades oblong-elliptic to elliptic, blunt at both ends, with recurved margins and a small mucro, 10–25 mm. by 5–12 mm., somewhat leathery, dark green on the face with scattered mostly deciduous scales, glaucous or yellowish on the back with imbricate unequally coloured scales (hence marked with rust brown dots, see Fig. 5), fugaciously ciliate and bristly towards the base of the midrib. *Fertile perules* elliptic-rotundate, 6–8 mm. long, finely silkily downy, with a few bristles and scales; bracts similar, but smaller. *Flowers* 2 or 3 from a bud, rarely more; pedicels 6–12 mm. long; *their hair-covering like that of the young branches, but softer*. *Calyx* widely cup-shaped, deeply 5-cleft (Fig. 6); segments rotundate-ovate, blunt, 6–8 mm. by 5 mm. long, ciliate, without more or less red, delicately downy and more or less scaly, within glabrous. *Corolla* almost rotate (Fig. 7), 5-lobed, 3.5–4.5 cm. in diameter, rose-purple with deep-purple spots on the back of the throat, which is minutely downy at the base, silkily downy on the outside and often scaly in the middle (Fig. 8). *Stamens* 10; filaments bearded above the base (see Fig. 9), the longest up to 4 cm. long. *Ovary* (see Fig. 6) green, densely scaly, 5-celled; style 13 mm. long. *Capsule* oblong-ovoid, 1 cm. long, blackish-brown, scaly; valves hard.

DISTRIBUTION.—Northwest Yunnan: Mountains of the Yangtse-Mekong-Salween divides between 3600 and 4200 m.

Figs. 1 and 2, flowering branchlets, nat. size; 3 and 4, a leaf in front- and back-view, nat. size; 5, scales from the back of a leaf, $\times 40$; 6, a flower with corolla and stamens recurved, $\times 4$; 7, a corolla, nat. size; 8, hairs and scales from the outside of a corolla, $\times 40$.



TAB. 9096.

CORDYLINE INDIVISA.

New Zealand.

LILIACEAE. Tribe DRACAENEAE.

CORDYLINE, Comm. ex JUSS.; *Benth. & Hook. f., Gen. Plant.* III. 779; *Engler in Engl. & Prantl, Nat. Pflanzenf.* II. 5. 73.

Cordyline indivisa, *Steud., Nomencl. ed.* II. 419 (1840); foliis ad 1.5 m. longis 10–20 cm. latis duris et panicula maxima compacta pendula ad 1.25 m. longa distinctissima.—Kunth, *Enum. Pl.* V. 30 (1850); Hook. f., *Fl. New Zeal.* I. 258 (1855) et in *Gard. Chron.* 1860, 792 et *Handb. Fl. New Zeal.* 282 (1864), 743 (1867); Lemaire in *Ill. Hort.* VII. t. 264 (1860); Buchanan in *Journ. Linn. Soc.* X. 59 (1869); Baker *ibid.* XIV. 543 (1875); Cheesm. in *Trans. New Zeal. Inst.* XII. 321 (1879); et Man. *Fl. New Zeal.* 707 (1906); Colenso in *Trans. New Zeal. Inst.* XVI. 387 (1884); Adams *ibid.* XVII. 276 (1885), XXX. 416, 430 (1898); Bois, *Dict. Hort.* I. 367 (1893); Kirk in *Trans. New Zeal. Inst.* XXIX. 528 (1897); Towson *ibid.* XXXIX. 390 (1907); Petrie *ibid.* XL. 303 (1908); Aston *ibid.* XLIII. 243 (1911), XLVI. 42, 49, 54 (1914); Poppelwell & Thomson, *ibid.* L. 149 (1918); Laing *ibid.* LI. 369, 384 (1919); Cockayne, *Veg. New Zeal. in Engler & Drude, Veg. Erde*, XIV. 145, 146, 211, 219, 291, 302, t. XXIX. f. 36. (1921).

Syn.: *C. Hookeri*, Kirk in *Trans. New Zeal. Inst.* VI. 245 (1874), in part (?)

C. Hectori, Colenso, *ibid.* XXV. 334 (1893).

Dracaena indivisa, G. Forster, *Pl. Esc. Ins. Oc. Austr.* 64 (1786) et *Prodr.* 24 (1786).

Charlwoodia indivisa, D. Don in *Loud. Hort. Brit.* 130 (1830).

Terminalis indivisa, O. Kuntze, *Rev. Gen. Plant.* 717 (1891).

A most stately plant, and in Cheeseman's opinion by far the finest species of the genus. It was discovered by the Forsters on Cook's second voyage early in 1773 on the wooded cliffs of Dusky Bay in the extreme south-west of New Zealand. They do not seem to have collected any specimens, but George Forster gave an excellent description of it and prepared a number of sketches (now in the collections of the British Museum) showing the habit, a whole inflorescence in natural size and sufficient analyses to render the plant unmistakable. *C. indivisa* has since been found in many places along the whole of the west coast of the South Island and in Bank's Peninsula on the East coast, whilst in the North Island it is distributed from the Tararuas in the south almost to the latitude of Auckland. It often grows gregariously and occasionally forms extensive groves, becoming thus a prominent feature in the landscape, particularly after the removal of the primitive montane forest, provided that it was already present in the original association. Whilst *C. indivisa* descends to the sea-coast in Dusky Bay, it is

farther north restricted to the montane zone, so on Mt. Frederick, Westport ($41^{\circ} 50' \text{ S.}$) to 600–900 m., in the Bank's Peninsula (about $43^{\circ} 50' \text{ S.}$) to a zone above 540 m., and in the North Island to 600–1600 m., the highest station on record being just below the summit of Kikuranga in the Raukumara range (about $178^{\circ} 30' \text{ E.}$). Although our cordyline is so widely distributed and locally so common, there has been early and there is even now a considerable diversity of opinion among New Zealand botanists as to whether the *C. indivisa* of the North Island and that of the South Island are one species or two. The Rev. W. Colenso who was, about eighty years ago, the first to observe *C. indivisa* in the North Island (in the Ruahine mountains) suggested in a list of specimens put up for Sir William Hooker (July 1848) that it represented a new species for which he proposed the name *C. utilis* in reference to the extensive use which the natives make of the very durable fibre in the preparation of mats and garments; but the specimen itself (No. 1508) differs in no way from Forster's plant and the same is the case with a coloured drawing by Mrs. Hetley which Dr. Cheeseman communicated to Sir Joseph Hooker in 1886 to illustrate his concept of the species. Colenso's name *C. utilis* was not published, but the author adhered to his notion of the Ruahine plant as a distinct species and in 1892, described it as *C. Hectori*, relying mainly on Sir James Hector's description* of the flower of the Dusky Bay plant as "long elegant" and Hooker's similar term "large flowers." Whatever these terms were meant for, they cannot controvert the complete agreement between Forster's description and drawing and Colenso's Ruahine specimen, so that *C. Hectori* becomes undoubtedly a synonym of *C. indivisa*. The same would seem to apply to *C. Hookeri*, a species proposed by T. Kirk in 1873 and based on a plant which had been brought from Mt. Egmont, in the south-west of the North Island to Mr. Owan's garden at Epsom, Auckland, except that the outer tepals are rather lanceolate than oblong, tapering upwards and that those of the lower (barren?) flowers grow out very slightly, straighten and close up after flowering, attaining to a length of 7 mm. In this state the flowers look certainly peculiar, but more material and observation in the field are required to decide

* In Hooker's Handbook of the New Zealand Flora, 743.

the status of this form which may be only a sexual or quite casual modification.

C. indivisa is a shy flowerer, but its imposing habit and the fine colouring of its leaves with their yellow or orange or almost red midribs and main nerves render it an object of admiration wherever it can be given sufficient space for the full display of its beauty. It is perfectly hardy in Ireland and the south-west of England* and it forms magnificent specimens on the French side of the Channel. Otherwise it has long been used for vase-culture in green-houses. *C. indivisa* can easily be propagated by cuttings. To obtain these it is necessary to decapitate the plant, when it will freely sprout from the stem and provide material for cuttings. If grown in vases, the plants require good drainage and deep rich soil (equal parts of loam and peat with a good mixture of manure) and moderate watering. By propagation from seed several variegated strains have been obtained (see Linden, Ill. Hort. xxxv. t. 40 and xxxvii. t. 114).

C. indivisa seems to have first been introduced into cultivation by the firm of Lee of Hammersmith in the fifties of the last century. The particular tree which supplied the material for our plate stands in the grounds of Mr. E. H. Walpole of Dublin. Its exact age is not known. Its height is over 4 m. with a girth of over 1 m. whilst the leaves are up to 1.5 m. by up to 20 cm. and the inflorescence shown in figs. 1 and 4 measured 1.25 m.

DESCRIPTION.—A glabrous tree, 1.5 to 7.5 m. high with a stout erect usually simple trunk and a large dense head of imbricate, spreading or, the outermost, deflexed leaves (see Fig. 1). Leaves sessile, linear-subulate, slightly contracted above the base, 0.5 to over 1.5 m. by 10–21 cm., very thick and hard, green with a yellow to red midrib and primary nerves (Fig. 3). Panicle compact, pendulous, up to 1.25 m. long, as in Fig. 4, borne on a stout bracteate peduncle; barren lower bracts lanceolate, acute, often exceeding the panicle, green, rather firm; upper raceme-bearing bracts rapidly diminishing upwards and more or less membranous; racemes up to 15 cm. by 2.5 cm., very dense; flower supporting bracts lanceolate, acute, 4–5 mm. long, membranous, 1-nerved;

* Mr. P. D. Williams of Lanarth, St. Keverne, Cornwall, tells me that his impression of the plant as grown in Cornwall is that it suffers more from excessive wet than from say 10° (F) of frost.

pedicels up to 2 mm. long; bracteoles at the base of the pedicels rotundate to ovate-lanceolate, acuminate, 2 mm. long. *Perigone* purplish outside, white and more or less suffused with green and lilac inside (Fig. 6); *tube bell-shaped*, 3 mm. long; *lobes linear-oblong*, 6–7 mm. by 2·5 mm., *revolute*. *Filaments* 4·5 mm. long; anthers yellow, 1·5–1·75 mm. long. *Pistil* as in Fig. 8; style 4 mm. long. *Berry* globose, purplish blue, 8–9 mm. in diameter, supported by the shrivelled perigone. *Seeds* as in Fig. 11, 2·5 mm. long, black.

DISTRIBUTION.—North and South Island of New Zealand, in the latter mainly on the west coast.

O.S.

Fig. 1, the whole plant, $\times 1/50$; 2, a leaf, $\times 1/7$; 3, a back view of a section of a leaf, nat. size; 4, an inflorescence cut above the long basal bracts, $\times 1/7$; 5, a raceme, nat. size; 6, a flower, $\times 3$; 7, section of a flower, with the perigone segments straightened out, $\times 3$; 8, section of pistil, $\times 4$; 9, cross-section of ovary, $\times 10$; 10, a fruit, nat. size; 11, a seed, $\times 6$.



TAB. 9097.

JASMINUM BEESIANUM.

China.

OLEACEAE. Tribe JASMINEAE.

JASMINUM, Linn.; *Benth. & Hook. f., Gen. Plant.* II. 674; *Knoblauch in Engl. & Prantl, Nat. Pflanzenf.* IV. 2. 15.

Jasminum Beesianum, *Forrest & Diels in Not. Bot. Gard. Edinb.* V. 253 (1912); inter species unifoliolatas corolla rosea vel carminea breviter obtuseque lobata insignis.—*Leveillé, Fl. Kouy-Tchéou*, 293 (1914); *Rehder in Sargent, Pl. Wilson*, II. 615 (1916); *Preston in Gard. Chron.* LXXVII. 131 fig. 52 (1925).

Syn.: *J. Valbrayi*, *Leveillé in Fedde, Repert.* XIII. 337 (1914).

J. Delavayi, *Diels in Not. Bot. Gard. Edinb.* V. 253 (1912), nomen.

Whilst it is known that the buds of some of the white-flowered jasmines are flushed with red, no species with corollas wholly pink or carmine was on record until the discovery of *Jasminum Beesianum*, and in this respect it still stands alone in the vast genus. Nor does it seem to be closely connected with any other species, with the possible exception of the Indo-Chinese *J. undulatum*.

J. Beesianum was first collected about thirty years ago by French missionaries in southern Kweichow and in the adjoining parts of Yunnan. In 1904 E. H. Wilson met with it in Central Szechuan, probably somewhere near Tachienlu or Mount Omei. Further herbarium material accrued from Forrest's collections in the Lichiang range, northwestern Yunnan, and from E. Maire's, the Provicar Apostolic of Yunnan, but it was not until 1912 that the plant was named, the name connecting it with the firm of Bees Limited, for whom Forrest collected it in 1906 (No. 2021) and who introduced it into cultivation. Forrest's original and subsequent collectings (Nos. 5598, 10066) were all made in the Lichiang range at altitudes from 2,400–3,150 m. in dry open situations. Here according to Forrest it forms erect shrubs of 0·3 to over 2 m. in height, but Wilson and also C. Schneider, who observed it in the Lichiang range in 1914, describe it as a climber, and Schneider especially as a climber in hedges. *J. Beesianum* has proved perfectly hardy in this country and it seeds well. Grown as a free standing shrub it is apt to assume an untidy appearance. It should be given adequate support and might with advantage be grown against a wall, like other jasmines when flowers and fruits would no doubt

show up more effectively. The fragrant flowers, unless produced profusely, do not contrast as vividly with the dark green foliage as one might wish, however pretty they are individually, but the pendulous glossy black berries with which the plant is laden until late in the winter compensate for any disappointment earlier in the season. We are indebted for the material from which our plant was drawn to the Director of the Botanic Garden at Cambridge where the plant is doing extremely well.

DESCRIPTION.—An erect shrub up to over 3 m. high or a climber in hedges; branches more or less angular, minutely hairy when young (fig. 2), but soon quite glabrous. *Leaves* opposite, very shortly stalked; blades from broad-ovate to ovate-lanceolate from a broad rounded base, shortly or long tapering to a fine point, 20–25 cm. by 5–18 mm. or those of barren shoots up to 45 cm. by 22 mm., bright green, very minutely hairy to glabrous. *Flowers* in sessile or shortly peduncled 3-flowered or more or less reduced cymes, terminal on short leafy spurs; bracts, if present, finely subulate; pedicels 6–12 mm. long in the flower, up to 30 mm. long in the fruit, glabrous. *Calyx* glabrous, more or less persistent, deeply 6- or 7-cleft; tube 2 mm. long; segments finely subulate, 4–7 mm. long. *Corolla* rose to carmine, rarely pale rose to almost white (Wilson); tube 9–12 mm. long, hairy in the throat (Fig. 5), lobes mostly 6, elliptic-rotundate, about 5 mm. by almost 4 mm., with rounded tips. *Anthers* inserted above the middle of the tube, about 2.5 mm. long (Figs. 5 and 6). *Style* 10–11 mm. long; stigma capitate, 2-grooved. *Berries* didynamous or simple, owing to the abortion of one carpel; mericarps globose, somewhat depressed, glossy, black, 1- or 2-seeded, up to 12 mm. in diameter. *Seed* ellipsoid (if solitary) or broadly semi-ellipsoid, 5–6 mm. long. (Figs. 9 and 10).

DISTRIBUTION. — Central Szechuan (1,000–1,800 m.); Kweichou and North Yunnan (2,400–3,150 m.).

O.S.

Fig. 1, a portion of a flowering branch, nat. size; 2, a young branch, nat. size; 3 and 4, portions of a leaf, seen from above and below respectively, $\times 10$; 5, a flower in longitudinal section, $\times 3$; 6, anthers, $\times 6$; 7, a portion of a fruiting branch, nat. size; 8 and 9, a seed in back- and front-view respectively, $\times 3$; 10, longitudinal section of a seed, $\times 3$.



TAB. 9098.

POLYGONUM CAMPANULATUM.

India and China.

POLYGONACEAE. Tribe POLYGONEAE.

POLYGONUM, Linn.; *Benth. & Hook. f., Gen. Plant.* II. 97; *Dammer in Engl. & Prantl, Nat. Pflanzenf.* III. I a. 25.

Polygonatum campanulatum, *Hook. f., Fl. Brit. Ind.* V. 51 (1886), pro parte (vide infra); inter species sectionis *Aconopogonis* perianthio campanulato vix ad medium lobato pulcherrime roseo tincto et foliis acuminatis in dorso plerumque dense arachnoideo-tomentosis insignis.—Gage in *Rec. Bot. Surv. Ind.* II. 416 (1903); W. W. Smith & Cave, *ibid.* IV. 236 (1911); Diels in *Not. Bot. Gard. Edinb.* VII. 133, 152 (1912), 248 (1913); Irving in *Gard. Chron.* LII. 489, fig. 212 (1912) et in *The Garden*, LXXXVII. 603 c. ic. (1923); *Gard. Chron.* LXXIV. 363, fig. 129 (1923); W. W. Smith in *Rec. Bot. Surv. Ind.* IV. 408 (1913); G. J. in *Gardening Ill.* 1925, 406 cum fig. Syn.: *P. crispatum*, C. B. Clarke in *Journ. Linn. Soc.* XV. 138 (1876).

This most “beautiful plant,” to use an expression of C. B. Clarke’s, who often observed it in its Sikkim home, was first found by Sir Joseph Hooker in Eastern Nepal, close to the Sikkim frontier, in the late autumn of 1848 at altitudes ranging from 2,700–3,600 m. When twenty years later C. B. Clarke collected it on Yakla, on the eastern frontier of Sikkim, he identified it with *Coccolobium crispatum* (hence his combination *P. crispatum*), a Nepal plant named by Buchanan-Hamilton and described by Roxburgh; but as Roxburgh’s plant proved to be identical with the very different *P. chinense*, Hooker rejected Clarke’s name and substituted for it that of *P. campanulatum*, a very descriptive designation. Since then the plant has frequently been observed in Sikkim from the Singalela range in the west to the Chola-Yakla range in the east and within the same altitudes as in Nepal. Although not yet recorded from Bhutan it may confidently be expected to occur there as Forrest found it in 1906 in the Lichiang range in north-western Yunnan. Here it occurs in open pastures and in shady moist situations among scrub between 2,400 and 3,600 m.

Hooker included in *P. campanulatum* also Meissner’s *P. rumicifolium* var. ? *oblongum*, a plant collected by Strachey and Winterbottom at Jhuni (2,250 m.; 80° 3’ E., due south of the Pindari glacier), and he moreover distinguished three varieties (vars. *membranifolium*, *longipes* and *fulvidum*), all

within the Sikkim-Nepal area defined above. Of these var. *fulvidum* agrees exactly with our plant. It may be considered to represent typical *P. campanulatum*. Var. *membranifolium*, collected by Hooker in woods at Lachong (3,300 m.), is in my opinion a distinct species, characterized by thin large leaves, very sparingly hairy or almost glabrous on the back, and by small inflorescences, overtopped by the leaves; it may be called *P. membranifolium*. The residuum of Hooker's *P. campanulatum*, that is the Kumaon plant and the var. *longipes* offer an interesting problem to the taxonomist in so far as they differ from typical *P. campanulatum* in one point only, but in this point very decisively, that is the complete absence of the cobweb-hairs that constitute the fine whitish, buff or rust-brown felt on the back of the leaves of *P. campanulatum* which is, except for the appressed stiff hairs common to both forms, quite glabrous and smooth. To speak in the terms of the genetician, it seems as if the factor which determines the presence of the cobweb-hairs had dropped out or had been inhibited. That inhibition is the more probable of the two alternatives is suggested by a specimen in the Kew Herbarium from Yatung, Chumbi, which has the lowest six leaves cobwebby, whilst the other five are more or less densely covered with straight appressed hairs without any trace of the fine long curly hairs of the "cobweb," just as if the "cobweb"-factor had been inhibited after the formation of the sixth leaf. We might therefore speak of this form provisionally as a mutation of *P. campanulatum* and use for it Meissner's earlier varietal name *oblongum*. *P. campanulatum* proper and its mutation *oblongum* have the same vertical range in Sikkim, and they have repeatedly been collected in the same locality, as on Tongloo, at Jongri, here by C. B. Clarke on the same day and to judge by the numbering (Nos. 25989 and 25965) in close proximity and near Yatung.

The flowers of *P. campanulatum* exhibit a sexual dimorphism very similar to that observed in *Fagopyrum esculentum*, there being individuals with long filaments and short styles (Figs. 3 and 4) and others with short filaments and long styles. Cross fertilisation is moreover furthered by the position of the anthers and their dehiscence, those of the outer five stamens being in the fully open flower near the periphery of the mouth of the perianth and opening

introrsely, whilst those of the inner three stamens connive towards the centre and dehisce outwardly, so that the pollen of both sets is more likely to be carried away by insects, visiting a flower for the honey, which is secreted by the nectarial ring at the bottom of the perianth, than to be deposited on its stigma.

Our plant was first grown in this country as it seems by Miss Shaen of Binfield who received seed of it from Calcutta and with whom it flowered first in 1910. *P. campanulatum* is quite hardy in England and of very easy cultivation. It may be grown in almost any soil, preferably damp, but it requires protection from excessive sunlight. It forms dense low clumps which remain green in the winter and from which in the summer numerous flowering stems rise to 30–60 cm. in height. These bloom until late in the autumn, producing a succession of flowers, whose colour varies from pure white through all shades of rose to carmine. The clumps lend themselves readily to division for the purpose of propagation and as the stolons are mostly very short and overground (runners) there is no danger of the plant becoming a nuisance, as is the case with other knotworts. The specimen from which our plate was prepared was kindly communicated by Sir Frederick Moore who grows the plant with splendid effect in his garden at Rathfarnham, Co. Dublin.

DESCRIPTION.—A perennial *herb*, 30–60 cm. high, forming cushions of short or somewhat elongated small-leaved runners and of rosette-like bunches of very short and very close-leaved branches from the lower nodes; stems angular, varying from hairy to glabrous, often in different sections of the same individual. *Leaves* distinctly stalked; blades very variable in shape and size, ovate to ovate-elliptic or lanceolate from a blunt or pointed base, acuminate, 3·5–12 cm. by 1·5–5·5 cm. (those of the runners ovate, acute 7–8 mm. by 3–5 mm.), dark green, with or without a large purple-black blotch or stripe along the midrib and appressedly strigose, rarely glabrous on the face, *whitish to buff or rust-coloured and strigose on the main nerves, on the back with a densely matted cobwebby down all over*; stipules (ochreae) loosely tubular, obliquely truncate, 5–9 mm. long, appressedly hairy to tomentose, usually soon disintegrating. *Panicles* usually much contracted, 4–5 cm. long, more or less hairy,

composed of sessile or, in the lower part, peduncled short spikes of crowded or at length somewhat distant clusters (scorpid cymes) of flowers, often augmented by secondary long-stalked panicles from the preceding leaves and then up to 15 cm. long and more open; cymes 3–5-flowered, rarely with more than one flower open at a time; bracts broad-ovate, acute, shortly exceeding the pedicels, like the bracteoles, which are connate below, white, hyaline and mostly glabrous; pedicels articulated at the tip, 1.5–2 mm. long. *Perianth bell-shaped*, as in Fig. 2, 4.5 mm. long, and 5 mm. across, 5-lobed to less than half the length, white, flushed with rose to carmine. *Filaments* 3–3.5 mm. long, inserted on a thin annular disc; anthers dark, less than 0.5 mm. long. *Ovary* oblong, triquetrous; styles dimorphous (as to the heterostyly of this plant see above), very short, as in Fig. 4, or equalling or slightly exceeding the perianth. *Nut* ellipsoid in outline, triquetrous, 2 mm. long, brown. *Embryo* placed as in Fig. 6, with the cotyledons almost at a right angle to the radicle.

DISTRIBUTION.—Himalaya from East Nepal eastwards and West Yunnan, 2,400–3,600 m.

O.S.

Fig. 1, a flowering stem, nat. size; 2, a flower with the bract split in two halves in front and with the two bracteoles behind the pedicel, bracts and bracteoles united in a short tube at the base, $\times 4$; 3, a perianth expanded, $\times 5$; 4, pistil, $\times 12$; 5, nut, $\times 10$; 6, section through a nut, showing position of embryo, $\times 12$; 7, embryo, the lower half the radicle, the upper the tightly applied cotyledons, $\times 20$.



TAB. 9099.
 PYRACANTHA ATALANTIOIDES (flor.)
 ET
 PYRACANTHA YUNNANENSIS (fruct.).
China.

PYRACANTHA, *M. Roem.*; *Koehne, Gatt. Pom.* 931.—*Cotoneaster, Benth. & Hook. f., Gen. Plant.* I. 627, *pro parte*; *C. sect. Pyracantha, Wenzig*; *Focke in Engl. & Prantl., Nat. Pflanzenf.* III. 3. 21.

Pyracantha atalantioides, *Stapf. (nov. comb.)*; a *P. crenulata*, *Roem.*, foliis magis minusve oblongis ad lanceolatum vel ellipticum vergentibus distincta; a *P. yunnanensi*, *Chittenden*, et a *P. Rogersiana*, *Chittenden*, quibus similior, praeterea diametro maximo foliorum ad vel paulo supra vel infra medium sito, eorum basi acuta (vix cuneata) vel obtusa distat.

Syn.: *P. crenulata*, *C. K. Schneider, Ill. Handb. Laubholz* I. 761 (1906), II. 1004 (1912) *pro parte*; *Wilson in Sarg., Pl. Wils.* I. 177 (1912) quoad specimina *Wilson* 662, 2986; *Journ. Roy. Hort. Soc.* XLI. liv.. fig. 53 (1915); non *Roem.*

P. Gibbsii, *A. B. Jacks. in Gard. Chron.* LX. 309, fig. 133/3 (1916) et LXV. 266, 132 B (1919); *Bowles in The Garden*, LXXXII. 443 (1918) c. ic.; *Gard. Chron.* LXIII. 47, fig. 21 (1918) et LXXIII. 23, fig. 11 (1923); *Chittenden in Gard. Chron.* LXX. 325 (1921); *Journ. Roy. Hort. Soc.* XLVIII. 59, fig. 20 (1923).

P. discolor, *Rehd. in Journ. Arnold. Arb.* I. 260 (1920).

Sportella atalantioides, *Hance in Journ. Bot.* XV. 207 (1877).

Crataegus Pyracantha, *Hemsl. in Journ. Linn. Soc.* XXIII. 260 (1887); *Pritzel in Engl. Bot. Jahrb.* XXIX. 386 (1900) quoad *B. v. Rosthorn* 1801 (?).

P. yunnanensis, *Chittenden in Gard. Chron.* LXX. 325 (1921); a *P. atalantioides*, *Stapf*, foliis obovato-oblongis basin versus eximie cuneatis diametro maximo inter 2/3 et 4/5 longitudinis sito saepius superne conspicue crenatis semper apice rotundatis; a *P. Rogersiana*, *Chittenden*, foliis maioribus plerumque in quarta parte summa latis apice rotundatis longe basin versus cuneatis facie magis lucidis distincta.

Syn.: *P. crenulata*, *C. K. Schneider, ll. cc.*, *pro parte*; *Wilson in Sarg., Plant. Wilson*, I. 177 (1912) quoad specimina *Wilson* 2984, 2985, 4871, 4871 A; non *Roem.*

P. crenulata var. *yunnanensis*, *M. Vilm. ex Mottet in Rev. Hort.* LXXXV. 204 (1913) c. ic.

P. Gibbsii, *Rehder in Journ. Arnold. Arb.* V. 178 (1924); non *A. B. Jackson*.

P. Gibbsii var. *yunnanensis*, *A. B. Jacks. in Gard. Chron.* LXV. 266, fig. 132 A (1919); *A. O. in The Garden*, LXXXIII. 138 (1918) c. ic.

Cotoneaster Pyracantha, *Pritzel in Engl. Bot. Jahrb.* XXIX. 386 (1900), *pro maxima parte*; *Pampanini in Giorn. Nuov. Bot.* XVII. 288 (1910).

When the present plate was prepared, the complications which eventually arose in the working out of the letterpress were not foreseen. Hence the inclusion of two distinct forms in one plate, one in the flowering, the other in the fruiting state. Although this may appear unusual, it provides at least an opportunity of illustrating more completely a case of considerable intricacy than would have been possible if only one of the forms had been represented

in both states. Moreover the flowers and the fruits of the two forms depicted being practically interchangeable, their representation may be taken as interchangeable too. The complications I have alluded to arose partly out of the remarkably wide range of fluctuation not only among individuals obtained from a single batch of seeds, but also among parts of one and the same individual, and partly from the fact that it has not always been possible to trace the history of the cultivated material with the degree of exactitude necessary for the exclusion of error. In fact if we had to rely entirely on the labelling and naming of the garden specimens, the tangle of forms would appear so great as to exclude any chance of unravelling it. Fortunately the herbarium-material has been more helpful and it has, by the demonstration of the prevalence of certain types over wide areas, suggested a discrimination of more definite basic forms which may for the present be accepted as species. They have at any rate as much claim to this status as their western congeners, *P. crenulata* and *P. coccinea*, who owing to their isolation have preserved a much higher degree of uniformity.

The genus *Pyracantha* ranges from the extreme north-west of the Iberian Peninsula (Spanish Galicia) through the Himalaya to China. Its area is made up of three sections, the Mediterranean (Spain to the Caucasus) with *P. coccinea*, the Himalayan (outer ranges from Kulu to Bhutan) with *P. crenulata* and the Chinese (Yunnan to Kansu in the north and Kwangtung and Formosa in the south) with over half a dozen distinctive forms, some of which like *P. angustifolia*, *P. Fortunei*, *P. nelitriflora*, *P. Koizumi* are well marked, whilst others like *P. Rogersiana* and the forms depicted here are apparently in a state of flux, overlapping here and there or confluent by interbreeding. It is the latter group with which we are immediately concerned. This group (*P. atalantioides* and *P. yunnanensis* and *P. Rogersiana* of gardens) ranges from the Yunnan-Burma frontier through Kweichow and Hunan to the middle Yangtse and then northwards to Southern Kansu and Southern Shensi, reaching its easternmost point in the Ichang gorges. Taking a broad view of the distribution of these forms within their common area, we find (a) *P. Rogersiana* in the south-west between the Tali and Lichiang ranges and the Mekong and in the

neighbourhood of Mengtse (1,600–3,000 m.); (b) *P. yunnanensis*, in a central position from North-west Yunnan (see below) through Western Szechuan (2,000 m.) to Southern Kansu, Southern Shensi and Western Hupeh (here up to 1,300 m.) and (c) *P. atalantioides*, occupying the eastern section, from Kweichow and the adjoining parts of Szechuan to Western Hupeh and Western Hunan (300–1,300 m.), the areas of *P. yunnanensis* and *P. atalantioides* thus overlapping in Western Hupeh (e.g. at Tang Hsien). *P. Rogersiana* as represented by the field specimens is characterised by small leaves (12–30 mm. by 5–12 mm.), linear-oblong to oblong or obovate-oblong, only slightly wider above the middle and acute but hardly cuneate at the base and rather matt on the face. The short secondary branches of a year's growth end frequently, but by no means always, in spines. The field material available is on the whole very uniform, but narrow and long leaves occur among it which approach closely to those of the Himalayan *P. crenulata*. They are, however, firmer and their crenation or denticulation is much less marked, or they are practically entire. *P. Rogersiana* was introduced into cultivation from seed collected by Mr. Forrest for Mr. Bulley in the Lichiang range (No. 5597 ?) in 1910 or 1911. It had been found there previously by Delavay in 1889 (when it was identified by Franchet with *Crataegus crenulata*, Roxb., i.e. *Pyracantha crenulata*). The cultivated specimens resemble the wild state very closely, but the leaves are slightly larger and more conspicuously attenuated at the base and the larger of them are sometimes very distinctly toothed with an occasional tendency to becoming lobed. It is noteworthy that *P. Rogersiana*, whose area is nearest to that of *P. crenulata*, also approaches this most closely in structure, so that it is not surprising that it has been taken for it by such competent experts as Franchet and Vilmorin. How different on the other hand, is the *P. yunnanensis* of Szechuan or Kansu with its obovate-oblong, exquisitely cuneate, mostly bluntly crenate glossy leaves whose widest diameter is high up towards the rounded tips. *P. yunnanensis* was like *P. Rogersiana* originally described from cultivated specimens as a variety of *P. crenulata*. They had been raised at M. Maurice de Vilmorin's establishment at Verrières where they flowered and fruited for the first time in 1912 or 1913, the seeds being said to have been received through

Père Ducloux from Yunnan in 1906*. My enquiries about corresponding field-specimens of Ducloux's collecting have so far been fruitless, but M. Bonati informs me that Ducloux himself collected mainly around Tungchwan-fu and generally in the north-eastern corner of Yunnan and that the Rev. P. Maire actually collected the var. *yunnanensis* near Tungchwan-fu, so that we may look in this region of Yunnan, which juts in between Szechuan and Kweichou, for the origin of Vilmorin's seed.

The third kind differs from the preceding forms in its lanceolate- to elliptic-oblong or elliptic leaves with a usually acute to obtuse rarely cuneate base and an acute to obtuse tip and with their widest diameter at or just below or more often above the middle, their dimensions varying mostly between 30–50 mm. by 10–20 mm., but sinking occasionally as low as 15 mm. by 7 mm. or rising to 75 mm. by 25 mm. They are often quite entire or finally dentate or, when very large, conspicuously dentate over the greater part of the margins. The name "*atalantioides*" was given to it by Hance who had in 1880 received fruiting specimens from General W. Mesny from the neighbourhood of Kwei-yang, the capital of Kweichou. Hance based on it a new genus *Sportella*. The Kew specimen of Hance's plant represents a small-leaved spinescent state with obovate-oblong blades, 15–30 mm. by 7·5–12·5 mm., acute to shortly cuneate at the base, blunt at the top, finely crenulate along the margin, and more or less buff on the back. Wilson collected the same form in fruit for the Arnold Arboretum in December 1907 in the neighbourhood of Ichang (No. 662), and it is from this gathering that the garden plants, which yielded Mr. Jackson the material for the description of his *P. Gibbsii* and us for the delineation of the flowering branch and the analyses connected with it (Figs. 1–4 of our plate) were obtained.

* The original introduction of *P. yunnanensis* may date further back, as Kew as early as 1909 received a well grown branch of it from Herr W. Müller, then of Nocera near Naples, who had raised it from seed communicated to him by Padre Cipriani, an Italian missionary in Hupeh. A later introduction is that from seed collected by Reginald Farrer in the valley of the Nan Hor in southern Kansu in 1914 (Nos. 318, 329). He refers to it under the name *Crataegus crenulata*, on p. 55 of Vol. II. of his "On the Eaves of the World" in these words: "in habit stark and angular and thorny as a *Hippophaë* which has donned a dense load of bunched holly-berries in a yet more violent note of red all along its stiff and spiky boughs. But the Blood Hawthorn has its real and inordinate abundance down over the Kansu borders, well into the middle of Szechuan at the least." The fruiting branch represented in our plate (Figs. 5–10) was taken from a shrub raised at Kew from seed of this collecting.

These garden plants show, compared with the field specimen on the whole a considerable increase in the size of the leaves (up to 75 mm. by 25 mm.) and in some individuals a great range of variation in the shape of the leaves (lanceolate- to oblanceolate-oblong with acute tips and conspicuously serrate, or the other extreme, elliptic with rounded bases and tips and entire margins, the nervation being mostly obscure, but occasionally very distinctly impressed on the face). Similar but rather obtuse leaf-forms are associated in field specimens from Fang Hsien (Hupeh, Wilson, 2986), but most of the Herbarium material approaches more nearly Hance's plant. Wilson 2986 was subsequently laid down by Rehder as the "type" of his *P. discolor*, which thus becomes synonymous with *P. Gibbsii* and *P. atalantioides*. The other Hupeh specimens quoted by Rehder under *P. discolor*, Wilson 662 (in flower, Herb. Kew) and Wilson 349 (as to a part of the flowering branches) are identical with No. 662 in fruit, and to them may be added Henry 546 and 979, both from Ichang, then two unnumbered specimens collected by Maries in the Ichang gorges near Patung, and a specimen of F. S. A. Bourne's from Shuan-ching, S. Szechuan. An approach to the leaf-shape characteristic in *P. yunnanensis* may occasionally be observed in odd leaves of the specimens referred to and also in cultivated specimens, but in others it is more general, as in one piece of Henry 546, one (flowering) piece of Wilson 349, and in a specimen collected by F. S. A. Bourne near Chung-king (Szechuan). An instance of rather striking heterophylly is exhibited by Henry 979 (bis), which has the leaves of the older fruiting branches elliptic-oblong to obovate-elliptic and up to 3 cm. by 15 mm., whilst those of the young protruded shoots are rotundate-elliptic and mostly 8–10 mm. by 5–8 mm. This and Maries's specimens (leaves 13–25 mm. by 8–13 mm., mostly entire) may be modifications due to exposed cliff-stations. There is no difficulty in laying out the specimens in a series demonstrating gradual transitions from the *Rogersiana*- to the *yunnanensis*-type, and from the latter to the *atalantioides* type, and if we wish to interpret this fact we may either say that *P. Rogersiana* expanding its area has gradually been transformed into *P. yunnanensis* and this in turn into *P. atalantioides* or vice versa, or that the linkage is due to the filling in of the gaps by interbreeding in areas where the

originally more distinctive forms have met. In the present state of our knowledge we can prove neither; but the fact that batches of seeds of presumably identical origin have given rise to intermediate or aberrant forms and that individual bushes often show a remarkable diversity of foliage whilst the leaves of others are uniform, suggests strongly a mixing up of several (probably three) basic forms by interbreeding. This, of course, does not exclude the simultaneous appearance of new characters by mutation or progressive evolution, an occurrence which would naturally produce further complication and might create the impression of a single extremely "variable" species. According to the standpoint we choose to take in this matter we may therefore either speak of a primitive species, e.g. *P. crenata* and its derivatives, vars. *Rogersiana*, *yunnanensis* and *atalantioides* or we may speak of those forms as species connected by hybrids, or finally we may group them into a superspecies (Linnean species) composed of as many elementary species (subspecies) as we are able to distinguish and designate these by trinominals. Those who have had an opportunity of seeing typical specimens of the forms discussed and who are interested in securing their distinction—a largely practical question—will probably prefer to speak of them as "species" until added experience in field and experimental gardens has given us a better insight into their actual relationship. I would only add that such intermediate forms as I have spoken of should not be confused with undoubted modifications due to environment and characterised by stunting, extreme spinescence or reduction of foliage, or with the products of individual heterophylly, which latter is sometimes very striking, even if it should be possible to fix them by vegetative propagation, or finally with such minor variations as are exhibited by the appearance of yellow or orange, instead of scarlet or crimson, fruits.

DESCRIPTION.—1. ***Pyracantha atalantioides***. A mostly sparingly, or in exposed positions, more copiously spiny shrub, 1–6 m. high; branches, when quite young, fulvously downy, soon becoming glabrous with a dark reddish-brown smooth bark; spines mostly 1–2 cm. long. *Leaf-blades more or less oblong to lanceolate or elliptic, from an acute or more rarely shortly cuneate or rounded base, mostly blunt,*

more rarely subacute, widest at or near the middle, entire or very finely and often sparingly crenate or serrulate, mostly 3-5 cm. by 1-2 cm. or in specimens from very exposed stations much smaller (1.5 cm. by 0.8-1 cm.) or on the other hand up to over 7 cm. by 2.5 cm., bright green and glossy on the face, paler to almost glaucous on the back with a very early disappearing fulvous down; stalks 3-8 mm. long, downy when young. *Corymbs* many-flowered, downy below, 3-4 cm. in diameter; pedicels slender, glabrous, 0.3-1.5 cm. long. *Flowers* white or creamy white, 8-9 mm. across. *Receptacle* campanulate, glabrous. *Sepals* semiorbicular to ovate-orbicular, apiculate, 1 mm. long. *Petals* rotundate from a very short claw. *Stamens* about 20, up to 2 mm. long; anthers yellow. *Carpels* 5, with villous tops. *Fruit* globose, slightly depressed, crowned by the persistent sepals and stamens or their remains, 6-7 mm. in diameter, brilliant crimson or scarlet; stones dorsally adnate to the fruit-flesh to beyond the middle, pale brown.

DISTRIBUTION.—Kweichou and West-Hunan to South-eastern Szechuan and Hupeh.

2. *Pyracantha yunnanensis*. *Habit* of the preceding, but on the whole more spiny and mostly less hairy when young. *Leaf-blades* obovate-oblong from a long cuneate base, with rounded tips, mostly somewhat coarsely crenate or serrulate, rarely almost entire, widest between the upper 2/3 and 4/5, 2.5-6 cm. by 0.8-2.5 cm., glabrous except in the bud, otherwise as in *P. atalantioides*. *Flowers* and *fruits* as in the preceding species, or corymbs more compact and the flowers rather larger, 8-12 mm. in diameter.

DISTRIBUTION.—From North-eastern Yunnan through Szechuan to Kamsu and Shensi and to Western Hupeh.

O.S.

P. atalantioides: Fig. 1, a flowering branch, nat. size; 2, a longitudinal section through a flower with the petals removed, / 10; 3, a sepal, / 10; 4, a petal, / 5.

P. yunnanensis: 5, a fruiting branch, nat. size; 6, a fruit, / 6; 7, a longitudinal section through the same, / 6; 8, a stone, / 8; 9, a seed, / 8; 10, embryo, / 8.



W. E. Trevithick del. et lith.

TAB. 9100.

PRIMULA SIAMENSIS.

Siam.

PRIMULACEAE. Tribe PRIMULEAE.

PRIMULA L.; *Benth. & Hook. f., Gen. Plant.* II. 631; *Pax in Engl. & Prantl, Nat. Pflanzenf.* IV. 1. 105, *et in Engl., Pflanzenreich* IV. 237. 17.

Primula siamensis, *Craib in Kew Bull.* 1922, 238; *P. spicatae*, Franch., (*Bot. Mag.* t. 8821) arcte affinis, sed robustior, foliis leviter undulatis nec duplicato-serratis magis pilosis, inflorescentia eximie albo-farinosa, floribus potius maioribus distincta.—*Gard. Chron.* LXXXV. 89, fig. 35 (1924); *Journ. Roy. Hort. Soc. L.c.* (1925).

Speaking of *Primula spicata*, Forrest (*Not. Bot. Gard. Edinb.* iv. 222, 1908) says: "Of all the primulas there is not one that can compare with this small species in airy gracefulness. The scapes are so slender, they are scarcely able to bear the weight of the relatively large flowers, which the slightest current of air sets trembling and swaying. It is a lover of dry sunny situations . . . It is annual, setting seed very rapidly and withering almost immediately." I have quoted this passage, because with a slight modification it is also applicable to our plant which may indeed be looked upon as the Siamese counterpart of the Yunnanese *P. spicata*, just a little more robust in all parts with rather wavy than coarsely toothed leaf-margins and an abundance of "meal" in the inflorescence. It has also a somewhat prolonged life-cycle, being distinctly biennial, a fact which may be connected with its lower and more southern range of distribution (about 900 km. south of the Tali range, the home of *P. spicata*). It is according to its discoverer, Dr. A. F. G. Kerr, a rock-plant, growing in the crevices of the limestone mountains of the upper Meping Valley, N. of Chiangmai in the Siamese Shan States, at an elevation of 1,700 to 2,000 m. Its affinity with *P. nutans* (*Bot. Mag.* t. 8735) with which it was originally compared, is, to judge by the inflorescences, distinctly more remote; but as far as the leaves are concerned, the two are indeed very similar. Pax, in his monograph of *Primula* in the *Pflanzenreich* (1905), referred *P. spicata* to the section *Soldanelloides*, *P. nutans* to that of the *Capitatae*; but he also pointed out that *P. nutans* stands

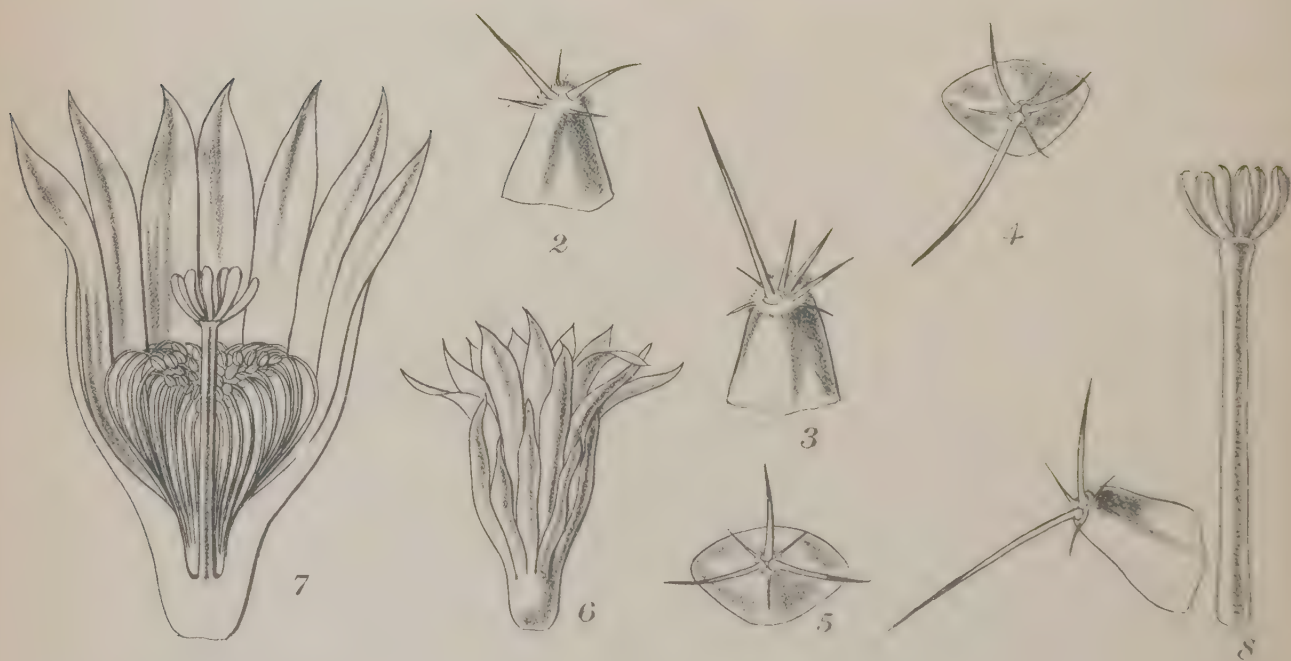
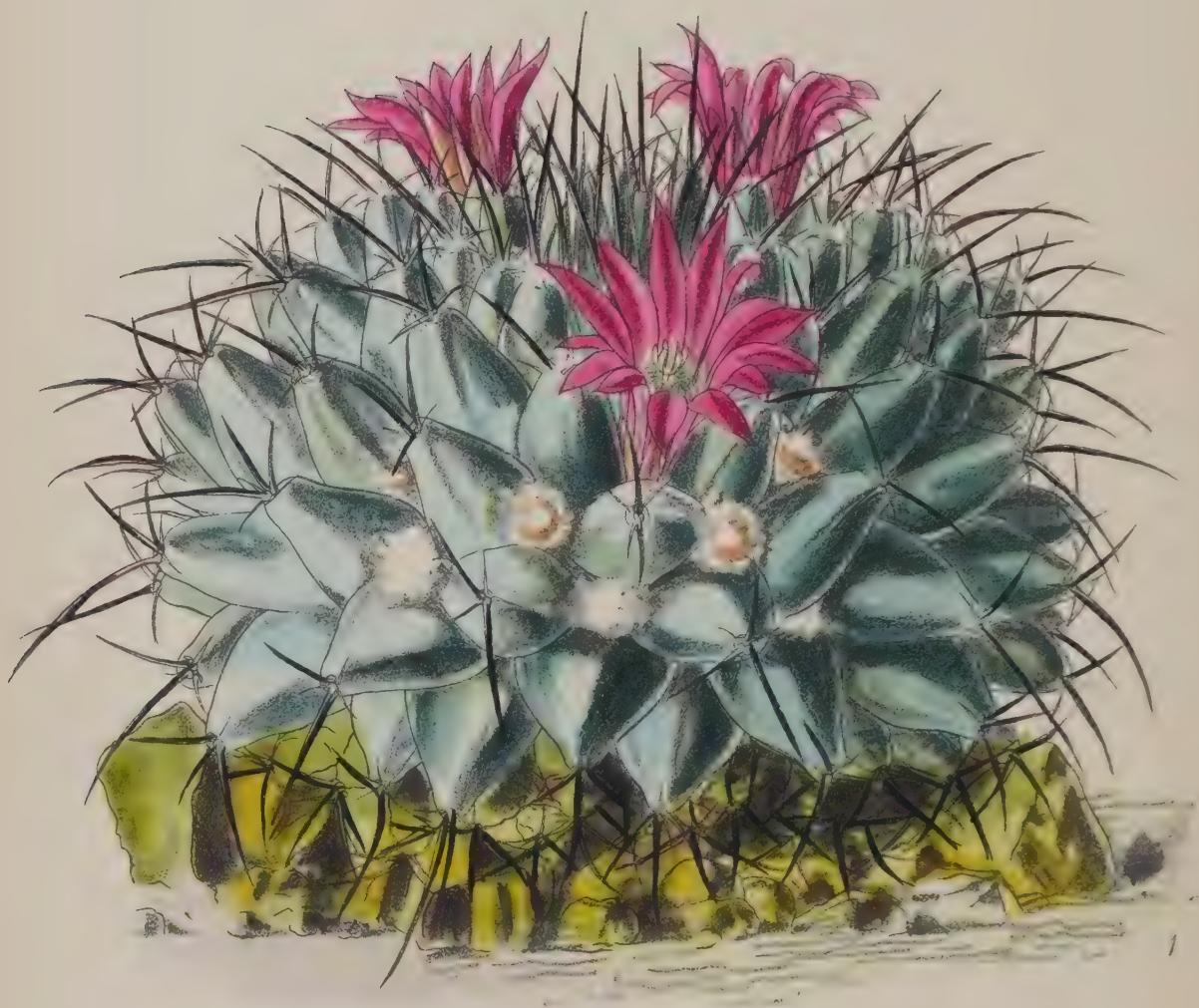
out among the *Capitatae* as “*primo intuito valde diversa*.” Sir I. Bailey Balfour has since (Journ. Hort. Bot. Soc. xxxix, 153, 1913) transferred *P. nutans* to the section *Soldanelloides*, a grouping which appears decidedly more natural. These *Soldanelloides*-primulas range from the Central Himalaya to West China and include some of the most beautiful members of the genus, such as *P. Reidii*, *P. Wattii*, *P. Wollastonii* and *P. Everestiana*. Like most species of this section, if not all—if the group is rightly understood—*P. siamensis* is monocarpic, and as it seems self-sterile, it will either have to be grown in large numbers, with a fair chance of insect-pollination or be pollinated artificially to insure seeding. Professor Craib who originally distributed seedlings of *P. siamensis* from the Cruikshanks Botanic Garden at Aberdeen—the plant depicted here was grown at Kew from one of his distributions—inform me that the percentage of germinations of the seeds received from Dr. Kerr was high and that testing the hardiness of the plants obtained by keeping one of them in an absolutely unheated greenhouse throughout the winter of 1923–24, he found that it came through as successfully as any of the others which had been kept in heat. As to duration, he adds, that the plant behaves in cultivation as a biennial, but he suspects it to be truly perennial as he received together with the seeds a rhizome from Dr. Kerr, which in 1923 produced fine foliage. It did, however, not flower and died off the following year. If I may judge by the appearance of the rather numerous field-specimens of this group which I have examined I would say that they are all short-lived, annual or biennial and monocarpic or at the most continuing for a few years, and that with some of the species it is largely a question of the conditions of the stations whether the individual plants behave in one way or the other. Professor Craib also failed to obtain seed, although there was some opportunity for cross-pollination; but then all his flowers were of the long-styled form. Artificial pollination was evidently not tried. I have added these observations because the primulas of this group are certainly among the gems of the genus and full of biological interest, and because I think that with a proper understanding of their ecology and life-history it should not be impossible to add them to the permanent treasures of our gardens.

DESCRIPTION. A monocarpic *herb*. *Leaf-blades* oblanceolate to elliptic-oblong, blunt or rounded at the apex, gradually attenuated towards the base and decurrent on the leaf-stalks, with slightly wavy ciliolate margins, 6–12 cm. by 2–3 cm., somewhat puckered, rich green, very softly hairy and minutely papillose on the back, hairs loose and curly on the face, longer, denser and more spreading on the nerves of the back; lateral nerves 5–9 on each side, branching near the margin with the nerves ending in often conspicuously produced water-glands; stalks 2–7 cm. long, winged. *Scape* up to over 15 cm. long, minutely papillose, particularly upwards, bearing a short and contracted or at length loose and *elongated spike* of 4–8 semipendent flowers; rhachis densely papillose, farinose; bracts linear to lanceolate, 4 mm. long, deciduous. *Calyx* more or less ellipsoid, 6–8 mm. long, *papillose-farinose, often snow-white except the tips of the ovate acute lobes*, these 2.5–3.5 mm. long. *Corolla-tube* funnel-shaped with a slender cylindrical basal portion, about 1 cm. long, and 1 cm. across at the short wide cup-shaped mouth; lobes broad-elliptic to ovate-elliptic, subacute, entire or *more often 2–4-dentate at the apex*, about 9 mm. by 6–8 mm., mauve to violet, papillose-farinose without and in the mouth of the corolla. *Stamens* of the short-styled state inserted 5–7 mm., of the long-styled state 3 mm. above the base of the corolla-tube; filaments very stout, 1 mm. long; anthers 2.5 mm. long, oblong. *Style* of the short-styled state 1.5 cm., of the long-styled state up to 6 mm. long; stigma as in Fig. 4.

DISTRIBUTION.—Mountains of North-west Siam.

O.S.

Fig. 1, a whole plant, nat. size; 2, a flower (long-styled form) in longitudinal section, $\times 2$; 3, a stamen, $\times 12$; 4, upper part of style with stigma, $\times 10$.



TAB. 9101.

MAMMILLARIA CONOPSEA.

Mexico.

CACTACEAE. Tribe CEREAE.

MAMMILLARIA, Haw. ; *Benth. & Hook. f., Gen. Plant.* I. 847 ; *K. Schum. in Engl. & Prantl, Nat. Pflanzenf.* III. 6a. 192 et *Gesammtbeschr. Kakt.* 472. *Neomammillaria*, *Britton & Rose, Cactaceae*, IV. 65.

Mammillaria conopsea, *Scheidweiler in Hort. Belg.* V. 118, t. VI. (April 1838), et in *Bull. Ac. Brux.* V. 494 (Aug. 1838), et in *Ann. Sc. Nat.* 2nd ser. X. 128 (1838), et in *Walp. Rep.* II. 299 (1843); cum *M. magnimamma*, Haw. et *M. macracantha*, DC. confusa, ab illa glaucedine, spinarum indole, floribus roseo-purpureis (haud lutescentibus), ab ha spinarum numero et dispositione necne floribus maioribus distincta.

Syn. : *M. centricirra* β *macrothele*, Lemaire, *Cact. Gen. Nov. Sp.* 42, 94 (1839).

M. centricirra, *K. Schum., Gesammtbeschr. Kakt.* 579 (1898) pro parte, haud Lemaire.

Neomammillaria magnimamma, *Britton & Rose, Cactaceae*, IV. 77 (1913), pro parte, haud Haw.

The plant figured here is one of about a dozen specimens which had been received at Kew at one time or another from public and private establishments, mostly abroad, under various names although they were specifically identical. This one especially was, like several more, named *Mammillaria centricirra*. There is no record of the acquisition of these "centricirras," but they, or their progenitors, appear to have been in the Gardens for many years and as it seems at one time in considerable number. Thus it was in 1902 possible to prepare from them a suite of specimens for the Herbarium whilst others were distributed. Of these one was communicated the same year to the New York Botanic Gardens, and of this a photographic reproduction (Fig. 72 on page 78) and a coloured drawing (t. ix. f. 4) may be found in *Britton & Rose's "Cactaceae,"* intended to illustrate *M. macracantha*, the former showing the plant as it was in 1905, the latter as it was in 1912. When our plant was selected for illustration in this Magazine, the question arose immediately, what was it to be called? Most of the six or seven names attached to the stock of plants from which it was taken were clearly out of the question for one or the other reason, but two required serious consideration, namely *M. macracantha* the name given to our plant by the authors of the "Cactaceae," and *M. centricirra*, a designation which as used in gardens had in the course of time come to cover a

great medley of forms. *M. macracantha* was proposed and fully described by A. P. De Candolle in 1828 from living material which he had received shortly before from Thomas Coulter who had collected it somewhere in Central Mexico, and six years later when it had flowered an excellent figure of it followed with further observations by the same author. It is in general habit no doubt similar to our plant, but the armature of the mammillae—two spines divergingly curved in a vertical plane and becoming smaller in the successive yearly growths until they almost disappear—and the rather smaller flowers are in my opinion sufficiently distinctive to exclude the applicability of the De Candollean name to our plant. The question of the second name, *M. centricirra* of Lemaire (1839) is more complicated unless we dispose of it altogether on the plea that it would in any case have to be superseded by *M. versicolor* of Scheidweiler, which was published one year earlier (1838). This would, however, not solve our problem which is not so much one of mere names as of identification. Unfortunately for that purpose we do not know with certainty what Lemaire's and Scheidweiler's plants were, as neither of them preserved a specimen or published a figure and as their descriptions were admittedly drawn up from a varied set of specimens which had not then flowered. During the next ten years, however, accounts of the flowers were added by other authors, who like Förster (1846) and Salm-Dyck (1849) may be relied upon, and these in connection with the earlier description of the plant-bodies suggest indeed that the original *M. centricirra* was identical with *M. magnimamma* (1824) as is assumed by Britton and Rose, who consequently replace the name *centricirra* by *magnimamma*. But is our plant really *M. magnimamma*? Now although *M. magnimamma* may not be recognisable from Haworth's short original diagnosis (1824), the emended description which Salm-Dyck supplied for De Candolle's *Prodromus* (1828) leaves no reasonable doubt that it is the cactus figured by Britton and Rose as *M. magnimamma* on t. xi. f. 1 and in Fig. 71 on p. 78 of their great monograph. It is a plant with strong yellowish spines, which radiate and curve and often twist close over its green body, and with yellowish flowers tinged with red, and it is therefore not the type depicted here. But if *M. magnimamma* in the original sense is thus out of the question, we have still

to sift the copious synonymy quoted by Schumann and by Britton and Rose in their respective monographs of the *Cactaceae* under *M. centricirra* and *Neomammillaria magnimamma*, these names covering practically the same plexus of forms. After a detailed scrutiny of this synonymy, which contains between 30 and 40 names—not counting mere garden- and trade-names and “new combinations”—and provides a wide field for genuine interpretation and for unprofitable speculation, I have come to the conclusion that the bulk of them is negligible because unverifiable owing to the inadequacy of the description and the absence of authenticated specimens or illustrations, whilst the residue consists partly of genuine synonyms of *M. magnimamma* such as *M. gladiata* (1828), *M. ceratophora* (1835) and probably *M. versicolor* (1838) (*M. centricirra* of Lemaire) and partly of names which actually refer to other species of *Mammillaria* some very remotely, some more closely, allied to *M. magnimamma*. Among the latter *M. conopsea* is the only one which interests us here more immediately. It was described by Scheidweiler (1838) from specimens collected by Galleotti near the Hacienda Peñasco, about 15 km. north of San Luis Potosi, and introduced by the firm of Vandermaelen of Brussels. Scheidweiler gave a figure of it, to all appearances, carefully drawn, and this gives us really the clue to the species and to the identification of our plant, in as far as it tallies, apart from the absence of flowers, so well with the Kew plant received by the New York gardens in 1902 as it was in 1905 (see *Cactaceae*, f. 72), that we may consider them as conspecific. At the same time Britton and Rose's other figure (t. ix. Fig. 4) which shows the plant when seven years older, is an equally fair counterpart of our picture which was drawn two years ago. Of the dried specimens, which in 1902 were, as stated above, preserved for the Herbarium, the majority corresponds to the adult state whilst others have the longer, slenderer and more curved or slightly twisted spines of the juvenile condition, although not quite to the same degree. There is then no reason to doubt that the plant of our plate represents a state—presumably a more mature state—of Scheidweiler's *M. conopsea*, and this name should therefore be accepted for it. Lemaire (1839) claims Scheidweiler's *M. conopsea* (1838) as identical with *M. centricirra* var. *macrothele*, which he admitted to be “aspectu

primo a praecedenti (i.e., *M. centricirra* vera) distinctissima." His description may not seem to agree exactly with Scheidweiler's, but this may be due to the fact that he coupled the "variety" with a form which was really not conspecific or else that he had more advanced individuals before him.

M. conopsea is of easy cultivation. It requires no treatment other than that given to Central Mexican mammillaries generally. It can be propagated from seed as well as by division, as older specimens frequently sprout laterally. It flowers freely and over a prolonged period, and the clear purple of the relatively large flowers contrasts pleasantly with the slightly glaucous green of the body and the snow-white wool of the axils.

DESCRIPTION.—*Body* subglobose up to 8 cm. by 9 cm. *Mammillae* ovoid to ovoid-oblong from a rhombic base, more or less obtusely four-angled to the top, up to 15 mm. long, 10–14 mm. in diameter where widest, glaucous, milking. *Areoles* up to 5 mm. in diameter, densely woolly when young, finally almost glabrous. *Spines* 5–7, very unequal, straight or gently curved, the outer 4–6 much shorter, 3 of them (the outermost) usually very fine, 4–5 mm. long, the following 1–3 stouter, 8–13 mm. long, the central one the longest up to 20 mm. long, almost erect in the young mammillae, then becoming horizontal or deflexed, cylindric, smooth, whitish with dark tips when young or the longest purplish or yellowish turning greyish or brown with age. *Axils* densely white-woolly. *Flowers* bell-shaped, up to 3 cm. long, and 3 cm. across (see Fig. 6). *Receptacle* shortly ovoid-globose. *Perianth-tube* short; *outer tepals* (sepals) linear, subacute, 15–18 mm. long, brownish-red with whitish margins; *inner tepals* (petals) about 10 or 11, linear-lanceolate, acute, about 25 mm. by 3–4 mm., deep rose with a darker middle-line. *Stamens* reaching to the middle of the perianth; filaments white; anthers pale yellow. *Style* about 12 mm. long; stigmas 6–7, 2.5 mm. long.

DISTRIBUTION.—Central Mexico, San Luis Potosi, 1760–1,800 m.

O.S.

Fig. 1, a whole plant, nat. size; 2–5, a selection of mammillae, all from the same plant, to show the variation of the spines, nat. size; 6, a flower in side-view, nat. size; 7, a flower in longitudinal section, $\times 2$; 8, style with stigmas, $\times 3$.



TAB. 9102.

BERBERIS LYCIOIDES.

India.

BERBERIDACEAE.

BERBERIS, Linn.; *Benth. & Hook. f., Gen. Plant.* I. 43 et 964; *Prantl in Engl. & Prantl, Nat. Pflanzenf.* III. 2. 77.

Berberis lycioides, Stapf (nov. spec.); *B. Lycio*, Royle, et *B. glaucocarpae*, Stapf (nom. nov. pro *B. coriacea*, Brandis, non St. Hilaire) arcte affinis, nisi ex iis hybrida; ab utraque racemis basi plerumque compositis, ab illa praeterea floribus fructibusque maioribus, ab altera foliis magis coriaceis subtus saepissime glaucescentibus, racemorum rhachi pedicellisque multo gracilioribus, fructibus ellipsoideis distincta. *B. aristata*, DC., differt ramorum cortice saepe rubro, pedunculis elongatis pedicellisque rubescentibus vel hisce sanguineis, baccis rubris vix vel nequaquam glauco-pruinosis.

Barberries of the Western Himalaya have apparently had a place in the materia medica of the peoples of northern India since immemorial times. Long ago Royle (*Trans. Linn. Soc.* xvii. 83–94; 1833) has suggested that the source of the Indian Lykion of Dioscorides was *B. Lycium*, a shrub common throughout the lower slopes of the Himalaya from Kumaon to Kashmir (900–2,000 m.), and his arguments are, indeed, so convincing that there can be little doubt as to this. However, there are other species so closely associated with *B. Lycium* by their morphological characters and incidence that we may well assume, that they too formed occasionally part of the valued drug.* They have been so long and so thoroughly confused by botanists that we cannot expect that the dealers of the ancient drug-markets have been more discriminative, although their distinctiveness has probably not escaped the eyes of local collectors or consumers. Royle himself was aware of this when he pointed out that from Kumaon to Simla the natives, otherwise “apt to confound things together,” distinguished between “Kushmul” (*B. Lycium*) and “Chitra” (*B. aristata*), the former confined to the lower levels (900–1,200 m.), the latter to higher altitudes (1,500–2,400 m.). This within certain limits seems to be true, but there are no doubt more species than those two involved. This is evident

* The herbaceous parts and the bark and the berries were imported. To-day an extract (rasout or rusot) from the dried stems and the roots is used in India. To this tonic, antiperiodic and diaphoretic properties are ascribed; but it has also been used by native and European doctors in diseases of the eye.

from the number of species proposed already in the early days of Indian botany and subsequently merged in an ever widening concept of *B. aristata*. In this place I can only deal with those to which I have referred in the Latin diagnosis.

B. aristata was originally proposed in ms. as *B. Chitra* by Buchanan-Hamilton who had collected it (1802-03) near Kathmandu and identified it with Kirkpatrick's Chootraphul (1792) from Dhunabiasi, a valley west of Kathmandu. A. P. De Candolle, however, when dealing with Buchanan-Hamilton's plant dropped for some reason the latter's name, then still unpublished, and replaced it by *B. aristata* which he described in his *Systema* in 1821. When Lindley in 1823 figured it in the *Botanical Register* (t. 729) he tried to restore the name *B. Chitria* (sic), but Sims in the *Botanical Magazine*, t. 2549, and William Hooker in *Exotic Flora*, t. 98* (both published in 1825) adhered to De Candolle's nomenclature. Since then the two names have run concurrently through literature and gardening, until recently C. Schneider suggested that they designated two distinct species. In this he was probably led by the remarkable variability of the foliage of *B. aristata* which ranges from perfectly entire lanceolate (part of Wallich's field-specimens) to spinously toothed, broadly elliptic leaves, as represented in Lindley's figure. *B. aristata* is the Chitra of Royle, a shrub with twigs having mostly a reddish bark with bright red peduncles and pedicels, the latter rather long and slender, and drooping long-stalked bunches of flowers compound at the base and with dark red elliptic-oblong fruits with no or little bloom, the leaves being in shape as described above, moderately firm when mature and not glaucous underneath. It is spread throughout the outer Himalaya from Nepal to the basin of the Sutlej, though rather rare west of the river, between 1,800 and 3,000 m. The other barberry for which I propose the name *B. glaucocarpa*, as Brandis's name *B. coriacea* is preoccupied, is easily recognised by its simple rather stout racemes and its globose, bluish-black berries borne on stiff, stumpy stalks covered with a bloom so abundant, that particularly in the early state, they resemble according to Parker

* The model of this figure was raised from seed which Wallich had received from Nepal where later in April, 1821, he collected the plant himself in flower. Whether Lindley's and Sims's, plants were of the same origin we do not know.

(Forest Flora of the Punjab, 15 under *B. aristata*; 1918), white currants, whilst the foliage is not unlike that of *B. aristata*. It was long taken for Royle's *B. coriaria* (Bot. Reg. 46) which has red globose fruits without bloom, as was already pointed out by Lindley, and seems to be confined to Kumaon. *B. glaucocarpa* has a pale bark and oblanceolate to obovate leaves which are entire or toothed—but mostly not markedly—and green on both sides. It ranges from Kumaon to the basin of the Ravi in Chamba within altitudes of 2,100 to 2,700 m. *B. Lycium* has similarly coloured, though not so glaucous fruits, but they are smaller and rather ellipsoid than globose, and their stalks are rather long and slender, whilst its flowers, borne in simple racemes, are smaller than any of the species afore mentioned, and its leaves at length more coriaceous and papillosely glaucous underneath. It was necessary to point out all this, as the plant figured here is in many respects intermediate between them without being referable to any of them. It has the pale bark and bluish- or purple-black white-bloomed berries of *B. Lycium* and *B. glaucocarpa*, the bloom of the berries being quite as rich as in the latter, whilst the leaves are in shape, substance and colour intermediate between those of *B. Lycium* and *B. aristata*, and the racemes combine the relative shortness of the peduncles and the colouring of the axes of the former with the richer branching and the larger flowers of the latter. We are indebted for the material of our plate to the late Mr. J. S. Gamble, who grew the shrub in his garden at Highfield, Liss (Hampshire), along with many other notable plants, which he raised from seed either gathered by himself or collected for him by his friends in the northwestern Himalaya, largely in Jaunsar,* which previously to his retirement in 1899 was the main field of his activity. Some of his field specimens, collected there or just over the border in Tehri Garhwal, approach our plant so closely that they can hardly be said to be distinct, whilst others verge more towards *B. Lycium* or *B. glaucocarpa*, both of which meet there, as for instance, at Konain and Mundali, at 2,100 m. *B. aristata* also occurs in Jaunsar, descending occasionally to 2,100 m. and mixing with either. There is therefore every chance for hybridisation, and the

* A very mountainous subdivision of the Dehra Dun District between the rivers Tons and Jumna.

intermediate position which our plant occupies between those species may well be due to this powerful factor. If it is so, the plant has, from the horticultural standpoint, certainly gained in abundance of flower and fruit, which renders it one of the most decorative barberries and, as the fruits make a delicious jam, also an object to be thought of by the fruit-grower.*

DESCRIPTION.—A perfectly glabrous *shrub*, up to 3 m. high, with terete branches covered with a smooth *light greyish-brown bark*. *Spine-leaves* divaricately 3-fid or the uppermost simple; spines straight or very slightly curved, up to 2 cm. long, equal or the lateral more or less reduced, pale brown. *Foliage-leaves* semi-deciduous, in fascicles of 4–6, oblanceolate, subacute with a minute or quite obscure mucro, with entire or slightly or spinulously toothed margins (see Fig. 11), 3–5·5 cm. by 0·8–1·5 cm., firmly papery, bright green on the face, *slightly glaucous but epapillose on the back*, reticulation finally raised on both sides. *Flowers* yellow, up to 1 cm. in diameter, in pendulous, mostly compound racemes, up to over 7 cm. long; bracts subulate, up to 3 mm. long; pedicels rarely over 7 (up to 10) mm. long; bracteoles 2, small, close to the calyx (see Fig. 4). *Calyx* of 3 whorls of sepals (Figs. 5–7) the outermost sepals small, ovate-lanceolate, acute, the inner oblong to obovate, subacute to very obtuse, 5–6 mm. long, concave. *Petals* in 2 whorls of 3, similar to the inner sepals, but shorter, 4 mm. long, with a pair of oblong glands at the base (Fig. 8). *Stamens* 4 mm. long, as in Fig. 9. *Ovary* cylindrical, with a disc-shaped stigma and 4 ovules (Fig. 10). *Berries* ovoid- or ellipsoid-oblong, 10–12 mm. by about 7 mm., *bluish-white owing to an abundant waxy bloom underneath it, black-purple or black-blue*. *Seeds* oblong, 5 mm. long, blackish-brown, slightly pitted.

DISTRIBUTION.—Northwestern Himalaya, probably Jaunsar.

O.S.

Fig. 1, a flowering branch, nat size.; 2, a flower, $\times 2\cdot5$; 3, the same in back view, $\times 3$; 4, a bracteole, $\times 4\cdot5$; 5–7, sepals of three successive whorls $\times 4\cdot5$; 8, a petal, $\times 4\cdot5$; 9, a stamen, $\times 6$; 10, a pistil in longitudinal section (two ovules only are shown) $\times 6$; 11, a fruiting branch, nat. size.

* The fruits of *B. aristata* are largely eaten by the Hill-people and also dried like raisins to be sold in the bazaars of the plains.



TAB. 9103.

MESEMBRIANTHEMUM STELLATUM.

South Africa.

MESEMBRIANTHEMUM.

Mesembrianthemum stellatum, Mill., *Gard. Dict. ed. VIII.* no. 14 (1768), *non* Haw., Obs.; *M. denso*, Haw., proximum, sed foliis brevibus magis glaucis, eorum papulis deorsum visis ovatis utrinque vel sursum tantum minute apiculatis, floribus minoribus brevius (3 cm. diametro) pedicellatis distinctum.—DC., *Pl. Grass.* t. 29 (1800) et *Prodr.* III. 440 (1828); Haw., *Rev. Succ.* 191 (1821) et in Tilloch, *Phil. Mag.* LXIV. 62 (1824); Drège in *Linnaea* XIX. 657 (1847); Salm-Dyck, *Monogr. Aloë* et *Mesembr.* 52, fig. 5 (1854); Sonder in Harvey & Sond., *Fl. Cap.* II. 447 (1862); Berger, *Mesembr. et Portul.* 84 (1908); Marloth, *Fl. South Afr.* I. 198d (1913).

Syn.: *M. barbatum* var. β , Linn., *Spec. Plant.* 842 (1753).

M. hirsutum, Haw., Obs. 297 (1794).

M. radiatum, *humile*, foliis minoribus, Dill., *Hort. Elth.* fig. 235 (1732).

Mesembrianthemum stellatum belongs to a well-defined and very natural group. This has long ago been recognised as a distinct series, which received the name "*Barbatae*" from the presence of a peculiar beard of radiating hairs on the tips of the leaves. So far nine species referable to the series have been described, but there is in the Herbarium at Kew undescribed material of several more. They are all inhabitants of the Karroo and similar dry regions from Namaqualand to the hinterland of Algoa Bay. Two of them, *M. barbatum* (*Bot. Mag.* t. 70) and *M. stellatum*, were early taken into cultivation (about 1700), no doubt in the first place by the Dutch whence they spread to German, French and English gardens. Others followed as, for instance, *M. densum* (*Bot. Mag.* t. 1220), and by 1824 six out of the nine definitely known species of the group were in cultivation. Then the keen interest in Cape plants which characterises the horticultural activities of the latter part of the eighteenth and the beginning of the nineteenth century flagged, and with it the mesembrianthemums, like other South African plants, were thrown into the background. However, Alwin Berger's work and N. E. Brown's recent very thorough studies have drawn renewed attention to the genus which offers a field of unexhausted variety in morphological and biological modifications and adaptations to the student who looks beyond names and strives beyond the ambition of the mere collector, whilst at the same time the demands on the housing and the tending of the plants are so modest that their satis-

faction is within the reach of almost everyone. In this place we can only refer to one or two of the most remarkable features in the structure of our plant. It has already been observed that the series received its name *Barbatae* from the tufted hairs on the leaf-tips. Dr. Marloth in "The Flora of South Africa," i. 200, Fig. 91 b, has given a view of one of those hairs in longitudinal section and he has explained its structure (p. 202) thus:—"Each hair has a much inflated base, which is set in a strong protective cup; the bottom of this cup, which adjoins the water-tissue, is thin-walled and permeable to water as long as the leaf is young and growing, hence water absorbed from rain or dew by the hairs can pass into the tissue of the leaf, while in dry weather the exposed portion of the hair shrivels up and prevents loss of water from within (Fig. 91b on page 200). On old leaves the hairs are dead, for the tissue immediately adjoining their base has become suberized, the plug of cork thus formed preventing communication between the inner tissue and the hair." Dr. O. Oberstein, who has studied the structure of the leaves of the *Barbatae* more in detail (see Beih. Bot. Centralbl. xxix. 298-302, tt. vi. and vii.; 1912) finds that the cork-lamella at the base of the hairs is formed so early that their functions as water-absorbing organs is probably negligible, and as the hairs appear very early—almost before the leaf becomes visible—he suggests that they may act as a protection against the effects of excessive transpiration for the youngest leaf-pair and the growing point of the axis, whose presence is indicated for some time only by a long hair-tuft emerging from the angle formed by the next leaf-pair. Once the leaves have grown out and the cork-layer is established, those hairs are mere appendages, decorative no doubt, but probably useless for the life of the plant. It is different with the blister-like papulae of the leaf-epidermis. These are enormously enlarged epidermis-cells which act as water-reservoirs for the underlying tissues. They are outwards coated with a continuous highly-polished cuticle, which reflects light and heat like a mirror, whilst inwards they are in contact with the delicate top-walls of wide palisade-cells. They form thus a permanently wet sheathing which in co-operation with the central water-cylinder keeps the water-contents of the leaves at a working level, even under the fiercest sun. The minute cells of the normal

epidermis and the equally minute stomata are confined to the narrow reticulating interstices between the papulae, whilst below them there are bands of a small-celled parenchyma with a richer content of chlorophyll than that of the palisade-cells. There were no capsules available at the time of the preparation of the plate. Recently, however, I have come across some which were sufficiently developed to exhibit the salient features. The structure is evidently the same as in *M. barbatum*.

I have only to add that the position of our species in Mr. N. E. Brown's new system of the generic segregates of *Mesembrianthemum* is in *Mesembrianthemum*, sensu stricto.

It is not known where *M. stellatum* originally came from, the only records of authenticated localities being of a much later date. These are situated in the Karroo of Uitenhage, near the Zwartkops river, the Coega and the Zondags river, where Zeyher collected our plant early in 1829. The specimen figured in this place has been in cultivation at Kew for many years.

DESCRIPTION.—A densely caespitose *shrublet*, up to 10 cm. high; old branches gnarled, pale brown, up to 1.5 cm. in diameter, ultimate branchlets bearing tufts of closely crowded leaves as shown in Figs. 1 and 2. *Leaves* sub-cylindrical, slightly flat on the face, 5–8 mm. by 3–3.5 mm., more or less glaucous, covered with a coat of densely packed *ovate-elliptic papulae*, minutely apiculate at both ends, or in old specimens only at the upper end, hence more or less rough (*but never much*), crowned at the tips with a tuft of 12–15 radiating hairs, 2–4 mm. long, white from a wider yellow base. *Flowers* 3 cm. in diameter, solitary on downy stalks, 5–10 mm. long. *Receptacle* top-shaped to semi-globose, about 7 mm. in diameter, papulose and downy. *Sepals* 6–8 (mostly 6), unequal, 3–5 cm. long, repeating more or less the structure of the leaves, but the inner flattened and smooth on the outside and laterally expanded into membranous wings (*see* Fig. 6), sparsely downy, apical hairs few to none. *Petals* about 30 in a single row, linear, subacute, spreading and recurved at length, 10 mm. by 0.5–0.6 mm., rose-purple. *Stamens* conniving into an urn-shaped exerted cone, the outer, reduced to filiform upwards curled staminodes; filaments about 4 mm. long, minutely

papillose, pinkish white, the innermost much shorter, sometimes with a few hairs (Fig. 8). *Ovary* 6-8-merous (mostly 6-merous), almost entirely immersed in the receptacle with a slightly convex crown, surrounded by 6-8 fleshy dark green glands, almost 1 mm. in diameter; stigmas at length appressed to the crown of the ovary, spathulate-lanceolate (Fig. 9). *Capsule* about 4 mm. in diameter, opening with 6-8 valves when moistened; valve-stays (expanding keels) anticously almost contiguous, widely winged; intervalvular knobs none. *Seeds* globose, brown, 0.4 mm. in diameter.

DISTRIBUTION.—Karoo of Uitenhage, below 300 m.

O.S.

Fig 1, a whole plant, nat. size; 2, a branchlet, seen sideways, nat. size; 3, upper half of a leaf, $\times 6$; 4, a flower in side view, $\times 2$; 5, a longitudinal section of a flower, $\times 5$; 6, sepals, $\times 3$; 7, a stamen, $\times 10$; 8, an inner stamen, $\times 10$; 9, crown of ovary with stigmas.



TAB. 9104.

FRITILLARIA OLIVIERI.

Persia.

LILIACEAE. Tribe TULIPEAE.

FRITILLARIA, Linn.; *Benth. & Hook. f., Gen. Plant.* III. 817; *Engl. in Engl. & Prantl, Nat. Pflanzenf.* II. 5. 62.

Fritillaria Olivieri, *Baker in Journ. Linn. Soc.* XIV. 261 (1874); *F. ponticae*, Wahl., (*Bot. Mag.* t. 8865) *proxima*, sed foliis laete viridibus (haud glaucis) sursum magis attenuatis acutis vel subacuminatis, summis sparsis (haud ternatim verticillatis), nectariis subulato-lanceolatis (haud ovato- vel obovato-orbicularibus) distincta.—*Stapf in Denkschr. Ak. Wiss. Wien Math.-Nat. Kl.* 1. 18 (1885); *Bornmüll. in Beiheft. Bot. Centralbl.* XXIV. ii. 99 (1908).

This handsome plant has its home in a limited district in the mountains of ancient Media, which appears to be particularly rich in fritillaries. Bornmüller enumerates not less than 9 different species from an area about the size of Yorkshire. It was discovered in 1796 by Antoine Olivier, the French naturalist and traveller, on Mount Elwend, near Hamadan. The next to collect it there were Dr. J. E. Polak and Thomas Pichler in 1882, and Theodor Strauss in 1892. Since then, Bornmüller tells us, it has also been collected by Strauss in the mountains east of Kermanshah. It seems that Max Leichtlin of Baden-Baden received bulbs of the plant from Strauss, some of which reached Kew directly or indirectly between 1895 and 1902 (probably in 1897). It is evidently one of the rarest fritillaries in herbaria as well as in gardens; but as it is not only perfectly hardy, but also produces a rich crop of bulbils, and therefore lends itself well to propagation, there is no reason why it should not be grown much more commonly. Olivier found our plant in flower in the middle of June near the melting snow among a blow of tulips (probably *Tulipa cuspidata*), gentians (*Gentiana Olivieri*) and primulas (*Primula auriculata*); and Polak's collections from the upper region of the mountains suggest the same association. Olivier does not indicate the altitude of the locality* where he collected the fritillary, but as Pichler saw it in flower at 2,100 m. three weeks earlier in the season, it occupies probably a fairly wide belt on the slopes of the mountain, its flowering following the melting of the snow. At Kew, sprouting begins early in March and the

* The summit of Mt. Elwend is 3,270 m.

first flowers open at the end of April or the beginning of May.† In its home the bulbs are exposed to a long period of drought, followed by several months of deep snow. Although corresponding conditions can, of course, not be provided for it at Kew, *F. Olivieri* has nevertheless done very well there for many years in an open border with ordinary good garden-soil.

We have compared above *F. Olivieri* with *F. pontica*, a native of southern Macedonia and Thrace and the north-eastern section of Asia Minor. The similarity is mainly in the shape of the flower and its parts, but the foliage is strikingly different in colour and in the disposition of the leaves.

DESCRIPTION.—*Bulb* much depressed, about 3–4 cm. in diameter, up to 2 cm. high, of 2 outer large and very fleshy scales (see Figs. 7 and 8), producing bulbils very freely. *Flowering stem* slender, about 40–50 cm. high, 3–4-leaved, sheathed at the base for 2–3 cm. by 3 colourless subacute spathes; roots springing in a ring from the base of the scales. *Leaves sessile, narrowly lanceolate or the upper almost linear, acutely acuminate to acute*, slightly twisted, the lowermost about 10 cm. from the base, the following evenly scattered or the middle two approximate, up to 10 cm. by 17–8 mm., of a luscious bright green. *Flowers* solitary, nodding, 3–3.5 cm. long, and almost as wide, bell-shaped, with the tips of the tepals recurved. *Outer tepals* obovate-oblong, 12–14 mm. wide, blunt, slightly or quite obscurely apiculate and papillose at the tips, bright green outside with purple-brown margins upwards, more yellowish green inside, etesselate; *nectary* (see Figs. 2 and 3) about 4 mm. above the base, subulate-lanceolate, 8–9 mm. long, dark brown upwards, inner tepals broadly obovate, up to 30 mm. wide, very blunt, hardly apiculate, otherwise like the outer, but more brown. *Filaments* 12 mm. long, papillose; *anthers* 4–5 mm. long. *Pistil* as shown in Fig. 4.

DISTRIBUTION.—Western Persia. Mountains near Hamadan and Kermanshah.

O.S.

Fig. 1, two flowering stems (upper part only), nat. size; 2, outer tepal seen from within, nat. size; 2*, tip of the same, $\times 10$; 3, inner tepal seen from within, nat. size; 4, pistil and stamens, $\times 2$; 5, stamen, $\times 2$; 6, section through ovary, $\times 10$; 7, bulb, nat. size; 8, same seen from below, nat. size.

† The specimen from which the plate was prepared, flowered on May 5, 1924.



TAB. 9105.
RHODOSPATHA FORGETII.
Costarica.

ARACEAE. Tribe MONSTEREAE.

RHODOSPATHA, Poepp. ; *Engl. in DC., Mon. Phan. II. 231 et in Nat. Pflanzenf. II. 3. 119*
et in Pflanzenreich IV. 23B. 90 ; Benth. & Hook. f., Gen. Plant. III. 990.

Rhodospatha Forgetii, N. E. Brown in *Kew Bull.* 1913, 358 ; affinis *R. costaricensi*, Engl. & Krause, sed omnibus partibus maior et petiolorum vagina ad margines superiores integra, spadice stipitato, pistillis multo minus altis distincta.

Rhodospatha Forgetii was discovered in Costarica not many years ago by M. Louis Forget, when he collected there for Messrs. F. Sander & Sons of St. Albans. The plant flowered with them in 1913 and was described by Mr. N. E. Brown from a specimen communicated by the firm to Kew. It approaches very closely to *R. costaricensis* which in 1901 was discovered by A. Tonduz on the Pacific slopes near "Ferno de Boston" (Fernan de Bolson ?) in Costarica ; but the latter plant, to judge from Engler and Krause's description appears to differ sufficiently in being smaller in all parts, in the flowering axis being covered with flowers from the very base—hence no "stipe"—and in the much longer pistils. *R. Forgetii* is, of course, a stove plant which requires the usual treatment given to tropical aroids ; it may be propagated by seed or by cuttings. Just before the spathes open, they are of a delicate creamy white without and the most exquisite salmon-colour or rose within, comparable to the pearly flush on the mouth of certain shells ; but the creamy white soon turns dirty whilst the rose changes to yellowish as the spathes open, which happens tardily and as it were unwillingly, their bases breaking irregularly away from the stalk. The flower-laden spike or spadix undergoes a similar colour-change on becoming exposed to the air, the pure flesh-coloured tops of the pistils paling and the originally snow-white stigmas discolouring to a dull or dark brown.

There are about a dozen species of *Rhodospatha* known, all tropical American, ranging from Guatemala to Peru and eastwards to Guiana, Bahia and Minas Geraes. Apart from *R. pictum*, which is more frequently grown for its variegated leaves, few members of the genus have been or are at present in cultivation.

We are indebted to Professor W. W. Smith of Edinburgh for the communication of the specimen figured in this plate.

DESCRIPTION.—A perfectly glabrous *climber* with, in the upper part, short (1.5 cm.), internodes. *Leaves* of each sympodial member about 8 to 9 with stout petioles up to 45 cm. long from a widened and clasping base and up to 1.5 cm. in diameter, sheathing all along except for the last 2 or 3 cm. below the slightly swollen joint which is about 4 cm. distant from the base of the blade (fig. 3), *margin of sheath entire*: *blade* oblong from an acute and narrowly decurrent base, cuspidate, 45–60 cm. by 15–20 cm., dark green, somewhat shining, midrib rounded and prominent on the back, lateral nerves as shown in fig. 2, the primary very distinct and about 18 mm. distant. *Peduncle* up to 30 cm. long, clasped for most of its length by the uppermost leaf which is reduced to a green sheath with a subulate cusp (rudimentary blade). *Spathe* oblong in outline, acuminate, about 16 cm. long and up to 3.5 cm. wide, just before it opens creamy to brownish-white without, with a pinkish outer edge and a greenish cusp, when unrolled salmon-coloured with a delicate white bloom within, opening tardily and breaking up irregularly at the base (see fig. 6) and soon deciduous, the salmon-coloured inside fading rapidly to a dull yellow. *Spadix* cylindrical, 12 cm. by up to 1.4 cm., blunt, pale flesh-coloured, borne on a *stipe* up to 1.5 cm. by 1 cm. *Flowers* ♂, contiguous, closely packed. *Perianth* none. *Stamens* 4 (as in figs. 8 and 9); filaments 1–1.25 mm. long. *Pistil* as in figs. 8 and 10, more or less tetragonous, up to over 2.5 mm. high: stigmas at first white, soon turning brown, ovary imperfectly 2-celled; ovules numerous borne on papillose funicles along the central axis. *Seeds* unknown.

DISTRIBUTION.—Costarica.

O.S.

Fig. 1, a flowering shoot, $\times 1/7$; 2, a portion of a leaf in face-view, nat. size; 3, upper part of a leaf-stalk, nat. size; 4, a section of the sheathing portion of the petiole, nat. size; 5, an inflorescence, just ready to open, with the supporting leaf, nat. size; 6, an inflorescence, fully open, nat. size; 7, spathe of a young inflorescence, forcibly opened, before discolouring has set in, nat. size; 8, a flower, $\times 10$; 9, stamens in front- and back-view, $\times 12$; 10, a longitudinal section through a pistil, $\times 12$; 11, an ovule, $\times 40$.



TAB. 9106.
COTONEASTER AMBIGUA.
China.

POMACEAE. Tribe CRATAEGEAE.

COTONEASTER, Med.; *Benth. & Hook. f., Gen. Plant.* I. 627; *Focke in Engl. & Prantl, Nat. Pflanzenf.* III. 3. 21.

Cotoneaster ambigua, *Rehder & Wilson in Sargent, Pl. Wils.* I. 159 (1912); *C. acuminatae*, Lindl., et *C. acutifoliae*, Turcz., simillima, ab utraque floribus minoribus, receptaculo subglabro vel parce pubescente et fructibus globosis, ab illa praeterea fructuum colore atro distincta.—C. K. Schneider, Ill. Handb. Laubholz. II. 1003 (1912).

This is one of half a dozen black-fruited Chinese cotoneasters whose close relationship renders their distinction somewhat difficult and, may be, ambiguous. This fact no doubt suggested the name *ambigua* to the authors of our species although its share of ambiguity is not greater than that of its immediate allies. Of these *C. acutifolia* Turcz., with its variety *villosula*,* differs mainly in the larger flowers with a more downy receptacle and in the pyriform rather than globose fruits, whilst *C. foveolata*, another close ally, may be distinguished by its larger and ultimately almost glabrous leaves and by flowers which are very like those of *C. acutifolia*. *C. acutifolia* var. *villosula* has been repeatedly confused with the Himalayan *C. acuminata* which is very similar indeed, but has red fruits. This is an instance of a remarkable parallelism or convergence of forms which manifests itself in various groups of *Cotoneaster* and results in the occurrence of pairs of species very similar in every respect, but for the colour of the mature fruits, red in one and black in the other member of the pair. As the similarity, however, does not amount to specific identity and the distribution areas do not coincide, we cannot consider them as mere colour variations. Other instances of this parallelism to which Schneider has already referred, are *C. bullata* (red, Hupeh) and *C. moupinensis* (black, Szechuan) and *C. integerrima* (red, Europe to the Caucasus and the Altai) and *C. melanocarpa* (black, Siberia with transgression into North and East Europe and the Caucasus). *C. ambigua* was until recently known only from a somewhat limited area around Tachienlu, Szechuan, where

* *C. acutifolia* var. *laetevirens* is still imperfectly known and may be a distinct species.

Mr. E. H. Wilson discovered it in 1903, and in the Pan lan shan, about 50 km. N.N.W. of that town, at altitudes from 2,300–3,300 m. It comes therefore within the range of *C. acutifolia* var. *villosula* which, however, appears to be a plant of lower elevations (mostly 1,300–2,000 m.). Since then, C. Schneider collected what seems to be *C. ambigua* in the fruiting state also in the Lichiang range between 3,000 and 3,400 m.

We are obliged to the Marquis of Headfort for the supply of the specimen from which the plant was drawn. He had it about nine years ago from Sir Frederick Moore, then at Glasnevin. The plant is now over nine feet high and six feet through. It is perfectly hardy and flowers very freely every year, producing plenty of fruit which the birds seem to enjoy. It is easily propagated by seed but like all cotoneasters takes a year to germinate.

DESCRIPTION.—*A shrub*, up to 3 m. high, with straggling curved branches; young branches greyish-yellowish, pubescent or finally glabrescent; bark dark grey to greyish-brown. *Leaves* deciduous, stalked; blades ovate to oblong or elliptic from a shortly acute, or rarely, rounded base, acutely acuminate with entire margins and a mucron-like terminal water-gland, 2–5.5 cm. by 1.25–3 cm., densely fulvously tomentose outside in the bud, when unfolded loosely or sparingly hairy on the face, persistently and *loosely villous or glabrescent on the back*, dark green above, paler below, sometimes reddening when in fruit, lateral nerves about 4 on each side, looping well inside the margin; stalks 2–5 mm. long, hairs as on the twigs; stipules subulate, 4–5 mm. long, early deciduous. *Corymbs* borne on short leafy spurs, few to 10-flowered, hairy like the twigs; bracts and bracteoles subulate, up to over 2 mm. long; pedicels 1–3 mm. long. *Receptacle* almost bell-shaped, 3 mm. long, *sparingly downy or almost glabrous without, glabrous within*. *Sepals* broad-ovate, shortly acute or rounded with a minute apiculus, up to 1.5 mm. long, downy like the receptacle. *Petals* rotundate from a broad indistinct claw, very concave and conniving, 2.5–3 mm. long, whitish, flushed or blotched with crimson from the base on the back or almost entirely crimson. *Stamens* 15–20; filaments conniving over the crown of the ovary, 2.5 mm. long, reddish; anthers

yellow. *Carpels* free in the centre ; crown villous ; styles almost 3 mm. long. *Fruit globose*, about 8–12 mm. in diameter, jet-black, glossy ; stones 2–3, rarely 4 or 5, obovoid, 5–6 mm. long, more or less downy at the top, back adnate to the fruit-flesh to near the top, face brown and glossy.

DISTRIBUTION.—Central Szechuan to N.W. Yunnan.

O. S.

Fig. 1, a flowering branch, nat. size ; 2, a portion of a mature leaf (more calvescent than usual), seen from the back, $\times 6$; 3, a flower, $\times 3$; 4, a petal, $\times 8$; 5, a flower in longitudinal section without petals, $\times 3$; 6, a fruiting branch, nat. size ; 7, a stone, back view, $\times 3$; 8, the same in front view, $\times 3$.







TAB. 9107.
PRIMULA INAYATII.
Himalaya.

PRIMULACEAE. Tribe PRIMULEAE.

PRIMULA, Linn.; *Benth. & Hook. f., Gen. Plant.* II. 631; *Pax in Engl. & Prantl, Nat. Pflanzenf.* IV. 1. 105 et in *Engl. Pflanzenreich* IV. 237. 17.

Primula Inayatii, *Duthie in Ann. Bot. Gard. Calcutta*, IX. I. 49, t. 61 (1901); ex affinitate *P. erosae*,* Wall. ex Regel, sed foliis angustis ex oblanceolato ad lineare vergentibus subtus magis minusve farinosis minus argute eroso-dentatis vel subintegris, bracteis pedicellisque longioribus distincta.—Watt in *Journ. Roy. Hort. Soc.* XXIX. 299 (1904) et XXXIX. 201, 211 (1913); Pax in *Engl., Pflanzenreich* IV. 237. 117 (1905); Craib in *Journ. Roy. Hort. Soc.* XXXIX. 189 (1913); Besant in *Gard. Chron.* LXXIII. 121, fig. 59 (1923).

Syn.: *Primula Inayatii* var. *aureo-farinosa*, Pax in Fedde, *Rep.* II. 116 (1906); Meebold in *Engl., Bot. Jahrb.* XLIII. Beibl. 99, 64 (1909).

* There is a figure of "*P. erosa*" in t. 6916A of this Magazine. Pax has already expressed some doubt as to the correctness of the name attributed to the plant figured there, and I cannot but share his doubt. Unfortunately I have not been able to trace the original of the figure in the collections at Kew and I refrain, therefore, from identifying it.

Khan Inayat, Duthie's head plant-collector, "whose intelligence and enthusiasm have resulted in the discovery of several other new and rare plants in various parts of northern India," met with this plant first in the mountains of Hazara, where late in May he found it growing on wet rocks in the Kagan valley at 1,350 m. in 1897. It was then in fruit with the leaves full grown and up to over 26 cm. long (including the petiole). Two years later early in June Inayat collected the primula again in the same state in the neighbouring Siran valley near Shinkiari (about 34° 28' N.; 73° 20' E.), as it seems, at a higher elevation (1800 m.)*. One specimen was found on this occasion with remains of much shrunk and shrivelled flowers, whence Duthie's description of the limb of the corolla as only 6 mm. wide. To this error another was added owing to the presence of a fungus—according to Miss Wakefield very near to, if not identical with, *Polyactis infestans*—on some of the pedicels and calyces of Inayat's original collecting, which gave the author the impression of black hairs, whereas actually pedicels and calyces are quite glabrous except for their mealy covering. Since then our plant has been recorded from Uri in the valley of the Jhelum in Western Kashmir where Dr. Meebold collected it in June in 1905 and Mr. B. O.

* This is said to be the lower limit of snow-fall in Hazara.

Coventry in March 1920, both approximately at 1,200 m. Mr. Coventry whose specimens are in full flower says that the flowering period of the primula in this district extends from January to March, and that the corollas measure about 12 mm. in diameter. Professor Pax distinguished Meebold's specimens as a variety *aureo-farinosa* of *P. Inayatii* on account of the sulphur-yellow meal of the leaves and calyces, but the same meal also occurs on the younger leaves of Inayat's plant. Our primula varies very much in vigour; thus some of Inayat's specimens from the Siran valley represent an extremely stunted state with, in one case, solitary flowers and full grown leaves, barely 4 cm. long, whilst another of the same day's collecting has an umbel of about 20 flowers and leaves up to 23 cm. long. The more floriferous state with 12–25 flowers in an umbel is no doubt the normal and it may be looked for in cultivated specimens grown under congenial conditions. Professor Pax places *P. Inayatii* in his section *Callianthae*, a heterogeneous group of about 15 species, mostly natives of the Eastern Himalaya and Yunnan, Watt in his section *Purpurea*, which, however, also comprises all the other, but one, of Pax's Indian *Callianthae*. Watt does not deal with the Chinese portion of the section, but Balfour who discussed it before the Primula Conference (1913) distributes the Chinese *Callianthae* (seven species) over no less than six sections, so that we are evidently still far from understanding the generic relationship of these primulas. This is not the place to enlarge on the problem of sections in *Primula*. It will suffice to point out the immediate relationship of *P. Inayatii* which is easier to establish. This, in my opinion, lies with *P. erosa* a species of the outer Himalaya of Kumaon* and like our plant confined to relatively low levels (1,200–1,800 m.). It differs from it mainly in the longer bracts and pedicels and in the shape of the leaves, which moreover in *P. erosa* are already fully developed at the time of flowering, whilst in

* C. B. Clarke in Flora of British India, III. 486 says, "from Kumaon to Bhotan alt. 4500–9500 ft. (not seen in Sikkim)." There is no specimen of *P. erosa* from Bhutan in the Kew collections. Pax on the other hand records it from Khasia (Hooker & Thomson) and from Ladakh (Schlagintweit n. 920). As to the Bhutan and Khasia specimens referred to, they are evidently *P. erosioides*, whilst Schlagintweit's specimen is unknown to me. *P. erosa* as demonstrated by the field specimens in the Kew Herbarium is confined to an area of less than 800 sq. km. around Mussori in Kumaon.

P. Inayatii they continue to grow long afterwards. *P. Inayatii* was introduced by seed from Kashmir to the Glasnevin Gardens about ten years ago. It has so far done well there and is appreciated on account of its early flowering. A good picture of a group of this primula in the Glasnevin Gardens may be seen in the Gardeners' Chronicle, l.c. The drawing from which the present plate was prepared was originally made for Professor Balfour in 1919 from a plant grown in the Edinburgh Botanic Garden and we are indebted for the loan of it to his successor Professor W. W. Smith.

DESCRIPTION.—A perennial acaulescent herb. *Leaf-blades* oblanceolate to almost linear from a long attenuated base, shortly acute or rather blunt, more or less erosely serrulate to almost entire, about 7 cm. by 1–1.5 cm. (spring state) or up to 18 cm. by over 2 cm. (summer state), bright green on the face, variously mealy on the back, meal whitish to bright sulphur-yellow, scanty or more often abundant; stalks widened and sheathing towards the base, 1.5–3 cm. in the spring state, up to 10 cm. in the summer state, red. *Scape* 7–12 cm. high in flower, then growing out to over 15 cm., red, not mealy. *Umbels* few- to many-flowered; *bracts* subulate or more or less widened at the base, 0.75–1 cm. long; *pedicels* 1–2 cm. long. *Calyx* oblong, 5-cleft to below the middle, 5–6 mm. long, more or less mealy, tube reddish; lobes lanceolate to ovate-lanceolate, acute, green, widened at the base when ripe. *Corolla*-tube cylindrical, 7–10 mm. long, yellow or reddish below the middle, limb flat, 12–16 mm. across, blue-purple to lilac with a yellow eye; lobes obcordate. *Stamens* inserted 4 mm. above the base of the tube in the long-styled, and 7 mm. in the short-styled state; anthers 2–2.5 mm. long. *Ovary* subglobose; style up to 7 mm. long in the long-styled, 1.5–2.5 mm. in the short-styled state; stigma capitate, depressed. *Capsule* globose, 5 mm. high.

DISTRIBUTION.—Western Himalaya, Hazara, Kagan and the adjoining districts of Kashmir, 900–1,800 m.

O. S.

Fig. 1, a flowering plant (pin-eyed), nat. size; 2, a bract, $\times 5$; 3, a corolla, $\times 3.5$; 4, the same, in longitudinal section, $\times 3.5$; 5, anthers, $\times 18$; 6, stigma, $\times 20$.







TAB. 9108.
FRITILLARIA LIBANOTICA.
Orient.

LILIACEAE. Tribe TULIPEAE.

FRITILLARIA, Linn.; *Benth. & Hook. f., Gen. Plant.* III. 817; *Engl. in Engl. & Prantl, Nat. Pflanzenf.* II. 5. 62.

Fritillaria libanotica, *Baker in Journ. Linn. Soc.* XIV. 270 (1874); arctissime affinis *F. persicae*, Linn. (*Bot. Mag.* I. 1537), sed perigonio latius aperto depresso-obconico-campanulato pallidiore e viridi ad roseo-purpureum vel lilacinum vergente purpureo-vel fusco-venoso distincta.—Boiss., *Fl. Or.* V. 189 (1884); Tristram, *Surv. West Palest.* 426 (1884); Post, *Fl. Syr.* 804 (1896).

Syn. : *Fritillaria persica*, Coss., *Cat. Pl. Syr. & Palest.* 18 (1854), non Linn.

Theresia libanotica (incl. vars.), Boiss., *Diagn. ser. I. fasc. XIII.* 20 (1853); Barbey, *Herbor. Levant*, 72, 160 (1882).

Fritillaria libanotica and the very similar *F. persica* represent a peculiar branch of the genus *Fritillaria* in the broad sense in which it is generally accepted. *F. persica* has been known in European gardens for about 350 years although it has never been a common garden plant. *F. libanotica* is on the other hand a plant of modern introduction, unless we admit that it was occasionally grown under the name *F. persica* and thus escaped attention. In fact, one of the two plates, published in this Magazine as delineating *F. persica*, namely t. 962 (1806) may represent *F. libanotica*. At any rate the plant depicted is, if rendered faithfully, not *F. persica*. The second plate (t. 1537; 1813) on the other hand depicts undoubtedly the Persian plant and demonstrates very clearly the differences in the shape and colouring of the flowers of the two species, those of *F. libanotica* being much more often of the shape of a low cone with a wide base and of a paler colour, into which green and yellow enter freely, against the dark lurid purple and the bluish bloom of the sister species. Geographically they take each other's place, *F. persica* in the mountain ranges of the Zagros in Western Persia from 29° 30' N. northwards to Mount Ararat, *F. libanotica* in the lowlands and the mountains of Palestine and Southern Syria. The first definite record of the latter is by Boissier who in 1846 collected bulbs of it in the Lebanon on the road from Beirut to Damascus. These flowered in his garden at Valleyres the next year and it was from them that the species was originally described (1853) as *Theresia libanotica*. It is otherwise widely

distributed southwards through Palestine to Jerusalem and in Transjordan to the mountains of Moab. Although locally common it seems to occur on the whole sporadically, which may account for its having been overlooked so long. According to all accounts it inhabits dry stony ground and flowers early in the year. It was long in cultivation at Valleyres and occasionally also in other gardens as at La Mortala and at Kew, but on the whole it was, and still is, very rare. The individual, however, which is depicted in this place, originated from a recent supply of bulbs which Major Albert Pam, of Wormley Bury, Broxbourne, Herts, received from Beirut and of which he communicated a part to Kew in 1923. Here the plant was first grown under glass, but subsequently planted in a border in the open where it has stood the winter very well. Major Pam also informs me that it is perfectly hardy with him and flowers regularly every year. Boissier distinguished originally two varieties, *bracteata* and *ebracteata* according to the presence or absence of bracts supporting the flowers. They occur, he said, side by side, the bractless form being the rarer. Subsequently in *Flora Orientalis*, however, he dropped this distinction and rightly, as one and the same bulb may produce one year bracteate and the next year bractless inflorescences, or *vice versa*.

The distinctiveness of the group to which *F. libanotica* and *F. persica* belong was early recognised and it has repeatedly been insisted upon. Boerlage (1720) proposed already a distinct genus (*Lilio-fritillaria*) for the reception of *F. persica*, C. Koch (1849) created for it the genus *Theresia*, Parlatores (1854) *Tozzettia* and R. A. Salisbury (1866) *Lyperia*. Boerhave seems to have relied mainly on the bulb and the copious foliage, both of which reminded him of a lily, whilst the later authors saw the most characteristic differences in the racemose inflorescence, the shape of the perigone and the simple style. None of these characters taken by itself has much weight since we have become familiar with the "*Holostylae*"-series of fritillaries, as we meet in that series with similarly shaped flowers and entire styles and at least with a tendency towards a racemose arrangement of the flowers. There remains for consideration only the structure of the bulb, an organ of supreme importance in the life of these plants. Unfortunately few fritillaries have

so far been studied thoroughly in this respect whence we are hardly able to say how the various types suggested by habit and floral characters are supported by corresponding peculiarities in bulb-structure. Yet so much is certain, that there is considerable diversity in the latter, much greater indeed than for instance in *Lilium* or *Tulipa*, and it is very probable that we shall on this basis find the clue to the natural grouping of the species. In this place, however, I have to confine myself to describing the structure of the bulb of *F. libanotica* and to comparing it with that of *F. Meleagris* and *F. imperialis* as the best known representatives of the sections *Eu-Fritillaria* and *Petilium*, both of which species have long ago been studied very carefully by Irmisch.

A well grown bulb of *F. libanotica* taken up in January before sprouting had begun is shown in fig. 2 of our plate. Another taken just after flowering was then dissected, and this is the structure revealed, proceeding from the outermost coating to the centre : 1, an incomplete cover of macerated and disintegrated membranes, the remains of old depleted scales ; 2, a single large scale, very thick and fleshy (except for the membranous and more or less shrivelled tip), either closing up in front, but not fused unless low down, or gaping from the bottom upwards with the margins almost parallel and 7–10 mm. distant ; 3, the stem or its decayed remnants, just behind the margins of the scale, either completely concealed behind them as in our figure, or exposed in the gap between the margins ; 4, a large bud in the axil of the scale, of almost the length of the bulb and consisting of a large fleshy prophyll, appressed to the stem with its deeply channelled back, and a succession of eight or more lanceolate inwards decreasing scales, all very fleshy with the exception of the narrow thin margins. There was no trace of a secondary bud which would do duty for the second-next season. As the flowering stem bears no cataphylls at its base, the bud may be expected to arise normally in the axil of the first scale above the prophyll, the following scales growing out into foliage leaves. The first bud-scale would thus in the next season become the large outermost scale (store-scale) of the bulb, coated by the membranous remains of the prophyll and its own predecessor, and there would, apart from the bud-scales, be only one store-scale in the bulb to carry the plant from one season into the other. In

Fritillaria Meleagris on the other hand and in its immediate allies, there are always two persistent store-scales, generally small, depressedly semiglobose and contiguous with their very blunt edges, the stem (or stems) emerging centrally from them. In *F. imperialis* again, the number of persistent store-scales is about 5 and they are moreover congenitally fused to the middle or beyond it, completely encasing the stem base and the bud.

DESCRIPTION.—*Bulb* ellipsoid, up to over 5 cm. by 3.5 cm. whitish with a tuft of long roots more or less fleshy at the base (fig. 1). *Stem* like all other parts glabrous, up to 60 cm. (according to Boissier up to 1 m.) high and up to 10 mm. in diameter, dull green, glaucous, many-leaved. *Leaves* scattered, rarely some subverticillate, up to 30, sessile, lanceolate to linear-lanceolate, subacute, up to 15 cm. by 2.5 cm., dull pale-green, glaucous, mostly more or less twisted. *Inflor-escence* loosely racemose with up to over a dozen (to 25 according to Boissier) flowers, bracteate or ebracteate, up to over 30 cm. long; bracts, if any, foliaceous, linear, the lowest up to 8 cm. long; pedicels up to 2.5 cm. long in flower, to 4 cm. in fruit. *Perigone* nodding, widely obconically campanulate, 12–16 mm. long and up to over 2.5 cm. wide; *outer tepals* elliptic blunt, greenish, flushed with dull purple or rose upwards on the back, 1–1.5 cm. by 5–7 mm.; *inner tepals* longer, broad-elliptic to obovate-elliptic, rounded at the top, about 1.2–1.7 cm. by 8–9 mm., dull green and rose-purple on the back, more or less dull rose with darker veins inside, greenish towards the base, nectaries oblong, green or yellowish-green, those of the outer tepals broader. *Stamens* slightly unequal; filaments about 6–7 mm. long, inner up to 8 mm. long, all epapillose*; anthers oblong, up to 2.5 cm. long, and reddish before dehiscing, then shrinking and yellow. *Ovary* cylindric-oblong, longitudinally grooved, 6–8 mm. long; style 7–8 mm. long; stigma simple, punctiform. *Capsule* depressed-globose, up to 2.5 cm. in diameter, hexagonous, papery. *Seed* obovate, flat with narrow membranous margins, 6 mm. by 4 mm.

DISTRIBUTION.—Palestine and South Syria.

O. S.

Fig. 1, bulb, nat. size; 2, part of a stem, nat. size; 3, an ebracteate inflorescence, nat. size; 4, a flower, flattened out, $\times 2$; 5, a stamen, $\times 3$; 6, a pistil, $\times 3$.

* Boissier says "papillose." He was evidently misled by adhering pollen-grains which, seen with an ordinary pocket lens, create the impression of papillae.



TAB. 9109.

CIRROPETALUM MINIATUM.

Annam.

ORCHIDACEAE. Tribe EPIDENDREAE.

CIRROPETALUM, Lindl. ; *Benth. & Hook. f., Gen. Plant.* III. 504 ; *Pfitzer in Engl. & Prantl, Nat. Pflanzenf.* II. 6. 178.

Cirropetalum miniatum, *Rolfe in Kew Bull.* 1913, 28 ; cum *C. psittacoidi*, Ridley, comparandum a quo differt pseudobulbis maioribus, foliis brevioribus, floribus multo maioribus eximie miniatis, sepali postici et petalorum fimbriis aureis copiosis, columnae dentibus filiformi-subulatis.—*Rolfe in Orch. Review*, XXI. 237, 251 (1913) et XXIX. 144 (1921) ; *Bailey, Stand. Cycl. Hort.* 774 (1914).

This charming, brilliantly coloured orchid was introduced by Messrs. Sander & Sons from Annam, along with *Dendrobium Bronckartii*. It flowered in the Botanic Gardens at Glasnevin in 1910, and Mr. Rolfe described it three years later. Subsequently it was stated to have been seen by M. Maurice Valcke, a collector for M. T. Pauwels of Meirelbeke, Belgium, in Upper Laos, the hinterland of Annam, and a drawing of the Laos plant submitted to Kew by Mr. Valcke in 1912 leaves practically no doubt as to the correctness of this identification, although the tips of the leaves are shown emarginate in the drawing. Mr. Rolfe compared it with *C. psittacoides*, a species rather widely distributed through the Malay Peninsula and the adjoining parts of Siam. There is indeed some resemblance between the two, although one would hesitate to speak of affinity in the stricter sense of the term. The flowers of *C. psittacoides* are much smaller (dorsal sepal 3 mm. long, lateral sepals 3 cm. long) and red, except for the base of the sepal which is yellowish. One might also think of "affinity" with the remarkable *C. Collettii* (see *Bot. Mag.* t. 7198), a species of the southern Shan Hills, with which our species has much in common in the structure of the flower, but the very different innovation separates the two species rather sharply. The present plate was prepared in 1924 from a plant grown in Sir Jeremiah Colman's garden at Gatton Park near Reigate. It requires stove-culture at a temperature of 18–21° C. (65–70° F.) and the fibre mixture generally given to members of the genus.

DESCRIPTION.—An *epiphyte*. *Pseudobulbs* ovoid or nearly globose, grooved, green, 1–1·4 cm. by 1–1·2 cm. *Leaves* solitary, terminal, shortly stalked; blade linear-lanceolate, from a shortly narrowed base, subacute, 4–7 cm. by 0·8–1·5 cm., leathery, bright green. *Scape* obliquely erect or horizontally spreading from the base of the pseudobulb, very slender, about 8 cm. long, covered at the base with a few brownish linear-lanceolate tightly appressed cataphylls, 3–5 mm. long. *Flowers* bright orange, 7–8 in a flat umbel, supported by subulate bracts, 3–4 cm. long; pedicels about 4 cm. long, very slender. *Dorsal sepal* ovate, very concave, produced into an awn-like tail, including it 8–9 mm. long, ciliate all along; *cilia* golden-yellow, 0·5 mm. long. *Lateral sepals* united at the base for about 1·5 cm. into a false linear-lanceolate blade, then produced into filiform pendulous tails 4·5–5 cm. long, eciliate. *Petals* ovate, acuminate, 5 mm. long, ciliate like the dorsal sepal. *Lip* jointed on a slender slightly curved mentum, recurved, oblong, acute, 5 mm. long (measured along the curve), very fleshy. *Column* stout, 1·6–1·7 mm. long, conical, linear-oblong in front view (see fig. 6), 2-toothed, each tooth produced into a fine awn-like horn, 1 mm. long. *Anther* subglobose, papillose on the top; *pollinia* unequal, the larger obliquely ovoid, the smaller oblong.

DISTRIBUTION.—Annam and Upper Laos.

O. S.

Fig. 1, a whole plant in flower, nat. size; 2, a flower in side-view, $\times 2$; 3, the same in front-view, $\times 2$; 4, a flower in longitudinal section, with the tails of the lateral sepals cut off, $\times 4$; 5, receptacle, lip and column with anther, $\times 8$; 6, column and anther in front view, $\times 10$; 7, anther, $\times 10$; 8, pollinia, $\times 10$.



TAB. 9110.
BRUNNERA MACROPHYLLA.
Caucasia.

BORRAGINACEAE. Tribe ANCHUSEAE.

BRUNNERA, Stev.; *Cusuleac*, Beitr. z. Syst. d. Anchuseae in Publ. Soc. Nat. Romania, 1923, no. 6 (repr. p. 15); I. M. Johnston in Contrib. Gray Herb. Harvard Univ. New Ser. LXXIII. 54 (1924).—*Anchusa sect. Myosotoides*, A.DC., Prodr. X. 49; Benth. & Hook. f., Gen. Plant. II. 856; Gürke in Engl. & Prantl, Nat. Pflanzenf. IV. 3a, 114.

Brunnera macrophylla, I. M. Johnston l.c.; *B. orientali*, I. M. Johnston, affinis, sed foliis integris, basalibus cordatis, floribus minoribus, calyce fructifero vix aucto nucleis superato distincta.

Syn.: *Myosotis macrophylla*, Adam in Web. & Mohr, Beitr. z. Naturk. I. 46 (1805).
Anchusa myosotidiflora, Lehm., Asperif. 234 (1818); A. DC., Prodr. X. 50 (1846); Ledeb., Fl. Ross. III. 120 (1847–1849); Boiss., Fl. Or. IV. 157; Albow, Prodr. Fl. Colch. 179 (1895) et in Bull. Herb. Boiss. III. 512 (1895); Lipsky, Fl. Cauc. 395 (1899); Radde, Grundz. Pflanzenverbr. Kaukas. 116 (1899); Radde, Samml. Kauk. Mus. II. 129 (1901); Woronow in Monit. Jard. Bot. Tiflis, XIII. 11 (1908).
Brunnera myosotidiflora, Stev. in Bull. Soc. Imp. Nat. Mosc. XXIV. I. 582 (1851).

An old garden plant of great charm and considerable botanical interest. Introduced into English gardens from the Caucasus about a hundred years ago, it seems soon to have suffered a severe eclipse from which it has been recovering only slowly in our day. The striking resemblance of its flowers to those of a forget-me-not caused Adam, its discoverer, to refer it to the genus *Myosotis*, whilst he was well aware that in other respects the plant differed very much. Subsequently Lehmann (1818) in his monograph of the *Asperifoliae* transferred the species to *Anchusa* although there is little in the diagnosis of this genus to justify the transference. A. DeCandolle (1846) followed him so far, but created for it and for *A. neglecta*—a new species proposed by him—a distinct section *Myosotoides*, of which he says that it has the inflorescence and flowers of a *Myosotis*, but the leaves of a *Mertensia* or *Symphytum*. Since then its position as a rather aberrant type of *Anchusa* remained unquestioned except by Steven who in 1851 founded on it a new genus *Brunnera**. This genus, however, found no recognition. Yet the facies of our plant with its large thinly herbaceous ground-leaves, its bractless scorpioid cymes and its forget-me-not-like flowers fits so ill into our

* So named after Samuel Brunner, a Swiss botanist (1790–1844) whose acquaintance Steven seems to have made in the Crimea.

concept of *Anchusa* that nothing but the structure of the nutlets is left to connect it with it, a character which is tribal rather than generic. *A. neglecta* which I have mentioned above is in the same position and it too was at one time described as a *Myosotis* (*M. orientalis* Schenk). It differs from our plant mainly in the basal leaves being not cordate, but rounded or attenuated at the base, and in the calyx-teeth, which, as the fruit ripens, grow out and finally exceed it very much. It is a native of the mountains of Syria, Western Persia and northern Mesopotamia. Another species of the same type was described by Steven as *Brunnera sibirica* from specimens collected by Turczaninow near Tomsk in Western Siberia. It is DeCandolle's *Anchusa myosotidiflora* var. *grandiflora*, and apparently—I have seen no specimen—very similar to our plant. Still another plant referred by DeCandolle, though doubtfully, to his section *Myosotoides* is his Himalayan "*Anchusa* (?) *racemosa*." This has since been transferred to *Mertensia*. With this exception, *Myosotoides* so clearly forms a natural group, well defined and distinct from *Anchusa*, that the resumption of Steven's genus *Brunnera* can hardly be disputed. In fact, a Rumanian botanist Dr. Mibail Cuşuleac of Czernowitz (Cernauz) and independently of him⁵ and almost simultaneously, Mr. Ivan M. Johnston, of Harvard University, have recently, on a comparative study of the *Anchuseae*, come to the same conclusion, Mr. Johnston placing *Brunnera* between *Caryolopha* and *Anchusa*, although its relationship to these genera is not really close. Ecologically, the three species, *B. macrophylla*, *B. sibirica* and *B. orientalis* behave alike. They are all typical woodland plants, and in cultivation will therefore have to be treated as shade plants. Specimens grown at Kew in the shelter of shrubs and others in an open bed fully exposed to the sun show indeed remarkable differences in habit and in the size of the inflorescences and flowers, the latter measuring only 5–6 mm. across and only slightly overtopping the foliage. It is from the sheltered set that our plate was prepared. *B. macrophylla* was discovered in 1800 by Dr. Joh. Mich. Friedr. Adam (or Adams), who then accompanied Count Mussin-Puschkin on a prospecting tour in the Caucasus, in woods on the rocky banks of the Aragwa river near Annanur, to the north of Tiflis, and it has since been found eastwards as far as the

Chozal Dagħ above Lagodechi (46° E.); but its main area is on the western side of the Kur-Rion watershed from the Lower Tschorok-valley to the Msymta-basin (43° 40' N.). The regional distribution of the plant within this area is from a few meters above sea-level to about 2,200 m. (Albow). I need hardly mention that *B. macrophylla* is perfectly hardy in this country and can be grown anywhere in good soil, provided it is given a fair amount of shade.

DESCRIPTION.— A perennial *herb* with an oblique rootstock covered with the vestiges of cataphylls and leaf-bases, producing subterminally a few basal leaves and a number of leafy flowering stems, these up to 45 cm. high. *Basal leaves* borne on long more or less reversely hairy stalks, 7 to over 20 cm. long; *blades broad-ovate from a deeply cordate base*, acute, *entire*, 7–15 cm., thinly papery, dark green, appressedly hairy on both sides, hairs of the face partly very small, partly long (0·6 mm.) and slightly coarser, springing from a minute tubercle and more or less loosely spread, of the back more uniform, softer and denser; venation as shown in fig. 1. *Cauline leaves* much smaller, the lower stalked (stalks from 3 cm. to very short), the uppermost sessile, ovate from a rounded or, more rarely, slightly cordate base or suddenly contracted and decurrent on the stalk, 5–2 cm. by 3–1 cm., otherwise like the basal leaves. *Cymes* stalked, scorpioid, many-flowered, ebracteate, the lowest on maturity up to over 8 cm. long, collected into a finally lax and downwards leafy panicle whose spindle is 3–10 cm. long, all the axes minutely and appressedly hairy; pedicels filiform, the lower finally up to 1 cm. long. *Calyx* bell-shaped, 1·5 mm. long, deeply 5-cleft, minutely appressedly strigillose, teeth oblong-lanceolate, subacute. *Corolla-tube* almost bell- or top-shaped, over 2 mm. by 3 mm., pale, *half-closed by a ring of horizontally spreading rounded and obscurely 2-lobed finely papillose whitish scales (fornices)*: *limb* 5-lobed, flat, pink in bud, sky-blue when open, 7–9* mm. across, lobes obovate, very blunt or rounded. *Stamens* inserted below the middle of the corolla-tube, enclosed; filaments under 1 mm. long; anthers ovate, slightly longer. *Style* 0·6–0·7 mm. long. *Nutlets exerted from the calyx*, obliquely obovoid, ribbed as shown in figs. 6 and 7, with a rugulose ring at the base, 3 mm. long, dull brownish-grey.

DISTRIBUTION.—Western Caucasia from the lower Tschorok to the basin of the Msymta and eastward to the upper basin of the Kur, up to 1,800 m.

O.S.

Fig. 1, an inflorescence with a basal leaf behind it, nat. size; 2, corolla limb $\times 3$; 3, calyx, with two of the segments removed, and pistil, $\times 10$; 4, corolla-tube in longitudinal section, with stamens and pistils, $\times 6$; 5, stamens, $\times 10$ 6, a calyx with nutlets, $\times 3$; 7, a nutlet, $\times 3$.





TAB. 9111 ET 9112.

SARGENTODOXA CUNEATA.

China.

SARGENTODOXACEAE.

FAMILIA NOVA inter SCHIZANDRACEAS et LARDIZABALACEAS militans. PLANTA normaliter dioica. SEPALA ut petala et stamina 6, in verticillos 2 disposita, utriusque verticilli subimbricata, decidua. PETALA squamiformia, minuta. STAMINA in ♂ libera, filamentis brevibus, antheris oblongis extrorsum 2-rimosis, connectivo obtuse apiculato; in ♀ ad staminodia reducta, CARPELLA in ♂ pauca, rudimentaria, minuta, in ♀ numerosa, libera, toro ellipsoideo ordine spirali inserta, imbricatim conferta; stigma sessile in rostrum extra stigmatosum productum. OVULUM solitarium, ventrale, pendulum, fere amphitropum vel tandem anatropum, micropyle ventrali. FRUCTUS apocarpicus; torus valde auctus, globosus vel oblongus; carpella baccata, longe stipitata, parce pulposa, 1-sperma. SEMEN subglobosum, apice truncatum et hilo lato suberoso notatum; testa crustacea, dura, nitidissima; albumen carnosum, amylaceo-oleosum. EMBRYO parvulus, excentricus, oblique positus, subcylindricus, radícula cotyledonibus lineari-oblongis paulo crassior.—FRUTEX chinensis, sarmentosus vel scandens. RAMORUM ANNOTINORUM ET VETUSTORUM fasciculi vasculares 2-seriati, cylindro sclerefacto circumdati, 4-interiores maiores et 8 exteriores minores, in medulla parenchymatosa nidulantes. FOLIA primaria ramorum interdum simplicia et integra vel 3-loba, caetera 3-foliolata, decidua. FLORES racemosi.

SARGENTODOXA, Rehder & Wils. in Sargent, Pl. Wilson I. 351; Hutchinson, Fam. Flow. Pl. I. 100 (1926). Genus unicum.

Sargentodoxa cuneata, Rehder & Wils. l.c. (1913); species unica.—Handel-Mazzetti in Sitz. Ber. Ak. Wiss. Wien. Math.-Nat. Kl. Abt. I., 128. B., 4. H. 11, 13, 15 (1919). Syn.: *Holboellia cuneata*, Oliver in Hook., Ic. Plant. XIX. t. 1817, quoad ramum florentem et figs. 1–3 (1889); Diels in Engl. Bot. Jahrb. XXIX. 343 (1900); Réaumbourg in Bull. Soc. Bot. France LIII. 454, 458, fig. 3 (1906); Gagnepain in Bull. Mus. Nat. Hist. Paris. XIV. 67 (1908).

This plant in its passage through the hands of botanists has had a remarkable history. Discovered in the male state by A. Henry inside of Nanto Creek in the Ichang gorge almost forty years ago, it became mixed up with the fruiting condition of another plant found in the same district and was in this accidental combination described as a new species of *Holboellia* (*H. cuneata*) by Professor D. Oliver in 1889. When, twelve years later, the mistake was discovered by Professor L. Diels, the male part of Oliver's species was reserved for *Holboellia cuneata*, whilst the fruits were referred to *H. chinensis*—that is Franchet's earlier *Paravatia chinensis*—both species being at the same time made to constitute a

new subgenus of *Holboellia*, named *Sinofranchetia*. Seven years later Hemsley figured a female specimen (flowers and fruit) of Diel's *Holboellia chinensis* in Hooker's *Icones Plantarum* (t. 2842) and raising *Sinofranchetia* to generic rank, he named it *Sinofranchetia chinensis*: but he also suggested that the male component of *H. cuneata* "belongs probably to a new genus." This suggestion was subsequently confirmed (1913) by Rehder and Wilson, who, working with more complete material (male flowers and mature fruits), were able to point out a number of striking characters and named the new genus *Sargentodoxa* in compliment to Professor C. S. Sargent of the Arnold Arboretum. But whilst the specific and generic status of our plant was thus settled, a more serious question arose now, that of its place in the system of families. The ambiguity of its position was quite evident, but it was also so puzzling, that the authors hesitated to draw the obvious conclusion, pending the discovery of female flowers. They contented themselves for the time with placing *Sargentodoxa* with the *Lardizabalaceae* as an anomalous genus, remarking that the structure of the male flowers resembled much that found in *Holboellia*, whilst foliage and inflorescence recalled *Sinofranchetia* and that the fruit imitated the fruit of a *Kadsura* or *Schizandra*. These observations were quite correct as far as they went. Since then, female flowers have been obtained from specimens grown in this country. They have enabled us to fill in the gaps still left in our knowledge of the plant which indeed represents an extraordinary case of superimposition of characters of one family on those of another. This condition may be expressed most succinctly thus. *Sargentodoxa* is, in its external vegetative characters, practically a *Sinofranchetia*. It also tallies with this genus in the build of the inflorescences of both sexes, and in the structure of the flower, also of both sexes, up to the gynoecium. In the gynoecium, however, whether perfect or rudimentary, and in the fruit, *Sargentodoxa* breaks away not only from *Sinofranchetia*, but from *Lardizabalaceae* altogether, following the paradigm of *Schizandraceae*, except in so far as the carpels are strictly 1-ovulate and the seeds of a different shape with a different testa and hilum. To this has to be added, that the vascular structure of the stem has no parallel in either family whilst in other respects the anatomy of the plant

lacks peculiarities, considered characteristic of both families.* It is, as if the gynœcium of a *Schizandracea* had been grafted on a plant which is otherwise, at least externally, a *Sinofranchetia*. It might be asked whether there is in *Sargentodoxa* any approach towards *Menispermaceae* or *Berberidaceae*. The answer is that there is no more community of characters than there is between *Lardizabalaceae* and *Schizandraceae* generally on one side and *Menispermaceae* and *Berberidaceae* on the other. One may figure in one's imagination *Sargentodoxa* as a very old type and the result of a very singular linkage of characters either by hybridisation or by the fixation of a group of primitive factors in the female sphere in remote times when the differentiation of the common stock was not completed. Neither can be proved; but whilst any explanation of the origin of so remarkable a type as that of *Sargentodoxa* must necessarily be purely hypothetical, the fact of its isolated position cannot be gainsaid, and it stands only to reason that it should find adequate expression in our "system," that is to be recognised as the representative of a distinct family. To tack it on to *Lardizabalaceae* as an anomalous genus is no solution of the problem. It could only prejudice and delay it. The exigencies of space forbid us to enter in this place on a detailed discussion of the structure of the flowers and fruits of *Sargentodoxa*: but we hope that the student will find all the salient characters very fully set out in the Latin diagnosis of the family and in the extended description at the end of the article. I have already observed that *Sargentodoxa* was originally found by Professor A. Henry in the Ichang gorges near Nanto where, as well as at Patung, further up the river, it appears as a tall climber in trees.

* Mr. L. A. Boodle, Assistant-Keeper of the Jodrell Laboratory at Kew, has kindly given me the following summary account of the anatomy of the stem of *Sargentodoxa*, as compared with that of *Lardizabalaceae* and other allied families:—"The anatomical structure of *Sargentodoxa cuneata* differs from that typical of the *Lardizabalaceae* in the following particulars:—The vascular bundles of the stem are not arranged in a single ring; the periderm is pericyclic; elongated secretory sacs containing tannin and mucilage are present in the phloem of the stem-bundles; the zone of mechanical tissue outside the bundles is of a somewhat different type. These differences are not suggestive of very close affinity with other members of the *Lardizabalaceae*, and would agree with *Sargentodoxa* being a rather isolated type in this family, if included in it. Some slight significance may attach to the fact that tannin-mucilage-sacs of the same type as those of *Sargentodoxa* occur in the stem (phloem, etc.) of certain *Menispermaceae*. Mucilage-receptacles of somewhat similar character are found in the stem of some *Schizandraceae* and of *Caulophyllum* (*Berberidaceae*), but apparently have not been observed in the stem of other *Ranales*."

Wilson and Farges have since established its existence on both sides of the Ta-pa-shan in Hupeh as well as in eastern Szechuan, and Wilson especially says that it is quite common in thickets north of Hsing-shan. South of the Yangtse, Wilson met with it in the Chang yang shan (south of Ichang), whilst Cavallerie collected it at Pin-fan, not far from Kweiyong, the capital of Kweichou, and Dr. Handel-Mazzetti records it from the mixed forests of Kweichou as well as of Hunan, mentioning particularly the ombrophilous deciduous high-forest of the temple-grounds on the Yun shan near Wukang in South western Hunan. We owe the introduction of *Sargentodoxa* into cultivation to Mr. E. H. Wilson who in 1907 found it in fruit in Western Hupeh. It flowered in this country for the first time in the garden of Mr. C. J. Lucas of Warnham Court, Horsham, in May 1922. It is grown there against a wall; but some of the branches had fallen on the roof of a glass-house, and it was these branches which produced the female inflorescences, represented in t. 9112. Subsequently (1924) I received through the kindness of Professor W. W. Smith male and female inflorescences of a plant or plants which are grown indoors in the Botanic Garden at Edinburgh, and which like Mr. Lucas's plants were part of the original introduction. The plant is apparently quite hardy in the South and Southwest of England and in Ireland, where in the Glasnevin garden it covers a large wall space with its fine foliage. Unfortunately *Sargentodoxa* has so far not produced ripe fruit in this country so that it was necessary to fall back on a field-specimen of Wilson's (no. 168) for the illustration of the fruit and the seed. The flowers although disposed in graceful pendulous racemes are not showy, but they are sweet-scented, and the fruits, if we should succeed in maturing them, should by their quaint grape-like appearance add much to the interest of the gardener, not to speak of the botanist.

DESCRIPTION.—*A climbing shrub*, up to over 7m. high, perfectly glabrous with terete branches, covered after the first year with a smooth reddish-brown bark, almost devoid of lenticels and possessing scattered vascular strands, embedded in a parenchymatous pith, the whole enclosed in a sclerotic cylinder. *Axillary buds* ovoid, up to 8mm. long, possessing 4-8 imbricate or distichous brown leathery scales,

4-6 mm. long with thin margins and pointed tips, and growing out into very short barren or flowering spurs or, here and there, into slender long-shoots, the spurs carrying 1 or 2, rarely 3, leaves, the long shoots an indefinite number of them with the internodes up to 15 cm. long. *Leaves* deciduous, smooth, papery, of a rich glossy green; lowest leaves of long-shoots simple, broad-ovate from a truncate or cordate base, blunt or pointed, or irregularly bifid; all other leaves 3-foliolate, with a slender channelled stalk, up to over 10 cm. long; lateral leaflets deltoid with the outer basal angle very obtuse or obliquely ovate, acuminate, 3-7 cm. long, with 2 or 3 primary nerves; intermediate leaflet usually slightly smaller, shortly (4-8 mm.) stalked, obovate or rhombic-obovate from a wedge-shaped base, acute to acuminate, with 3 or 4 lateral nerves on each side of the midrib. *Racemes* (of both sexes) pendulous, loose, 7-12 cm. long, solitary from a scale below the leaf or leaves of a spur; bracts oblong to lanceolate, acute, 3-5 mm. long; pedicels slender, 1.5-2 cm. long, with 2 distant small bracteoles of the shape of the bracts. *Sepals* (of both sexes) imbricate in the young bud, linear or narrowly oblong, with wavy margins, blunt, spreading, 10-12 mm. by 2-3 mm., greenish-yellow. *Petals* (of both sexes) reduced to fleshy orbicular scales, 1.25 mm. long. *Stamens* of ♂ subequal; filaments linear, 1-1.5 mm. long; anthers oblong, apiculate, 1.5 to almost 2 mm. long; of ♀ reduced to staminodes, consisting of a linear flat body with 2 obscure flanges or very imperfect loculi in the upper half, more or less exceeding the petal-scales. *Carpels* of ♂ reduced to a few or more numerous minute awl-shaped bodies, seated on a small convex torus; of ♀ very numerous, spirally arranged in serried ranks on a subglobose or oblong torus and appressed to it, subulate-lanceolate, attenuated upwards into a short style curved outwards with the stigmatic surface along the outer curve, the whole carpel about 2 mm. long; stigmas secreting mucilage which finally envelops the whole gynoecium as with a film; ovule 1, pendulous, at first almost orthotropous, but soon amphitropous and finally almost anatropous with a wide ventral micropyle and two integuments. *Fruit* formed of the enlarged torus (up to 14 mm. by 12 mm.) and a number of berrylike stipitate mature carpels; stipe formed of the elongated base of the carpel, up to 12 mm. long; "berries" formed

of the remainder of the carpel less the deciduous style, globose, 7 mm. in diameter, black, with a more or less copious bluish bloom, pericarp thin, fleshy. *Seeds* pendulous, ovoid, truncate, globose, 5 mm. in diameter; testa firmly crustaceous, jet-black, very glossy; hilum basal, large, orbicular, brown; albumen fleshy, containing oil and starch. *Embryo* subcylindric, straight, 2.25 mm. long; radicle about as long as the cotyledons, but slightly stouter.

DISTRIBUTION.—Central China, from Kweichou and Western Hunan to Western Hupeh and North eastern Szechuan, 1300m. O.S.

Tab. 9111. Fig 1, a young shoot with leaves showing transition from the entire to the 3-foliolate state, nat. size; 2, a leaf from an old branch, nat. size; 3, a very young ♂ inflorescence, nat. size; 4, a section through a stem 2 or 3 years old, diagrammatic, $\times 10$; 5, a ♀ flower with unusually large stamincdes (the sepals removed) $\times 3$; 6, a portion of a ♂ inflorescence, nat. size; 7, a fully open flower, nat. size; 8, a ♂ flower with two of the sepals removed, $\times 2$; 9, a stamen with a gland-like petal at its base, $\times 8$; 10, the same in side-view, $\times 8$; 11, section through a ♂ flower, with the sepals removed (two of the gland-like petals, 3 stamens and one half of the torus and the rudimentary carpels are visible), $\times 8$; 12, a similar section, $\times 8$.

Tab. 9112. *Female*. Fig. 1, a part of a flowering branch, nat. size; 2, a flower, $\times 2$; 3, the same with the petals removed, $\times 4$; 4, the same as 3 in longitudinal section, $\times 4$; 5, a petal, $\times 6$; 6, a staminode, $\times 6$; 7, a carpel in longitudinal section, $\times 20$; 8, an ovule, $\times 30$; 9, an ovule in longitudinal section, $\times 60$; 10, an infructescence with only two flowers matured, nat. size; 11, a carpel with its stipe, $\times 2$; 12, a seed, in side view, $\times 4$; 13, the same in longitudinal section, $\times 4$; 14, the same in top-view, $\times 4$; 15, an embryo, $\times 8$.



Tab. 9113.
DIPLOMERIS HIRSUTA.
Himalaya.

ORCHIDACEAE. Tribe HABENARIEAE.

DIPLOMERIS, D. Don, Prod. Fl. Nepal. 26; *Benth. & Hook. f., Gen. Plant.* III. 627;
Pfitzer in Engl. & Prantl, Nat. Pflanzenf. II. 695.

Diplomeris hirsuta, Lindl., *Gen. & Spec. Orch.* 330 (1835); inter species generis foliis latis pendulis vel solo incumbentibus, floribus maiusculis, fere omnibus partibus pilosis insignis.—Hook. f., *Fl. Brit. Ind.* VI. 167 (1890); King & Pantling in *Ann. Calcutta Bot. Gard.* VIII. 337, t. 443 (1898); Kränzlin, *Orch. Gen. et Spec.* I. 471 (1898); Rolfe in *Orchid Review*, XXIV. 240 (1916).

Syn.: *Diplochilus hirsuta*, Lindl. in *Bot. Reg.* sub t. 1499 (1832).

A rare and very interesting orchid growing on sandstone rocks in the Teesta valley in Sikkim at 300-420 m. and in similar situations in the neighbouring parts of Bhutan at 450 m., also recorded from Gossein Than, north of Kathmandu, Nepal. It was in the latter place that Wallich's collector found it first in 1821 (Wall. Cat. no. 7065). On this Nepal specimen and on a similar plant from the Khasia hills, also from Wallich's collection, Lindley based his genus *Diplochilos* (1832) "a remarkable genus . . . with a horizontal anther, the bases of which are exceedingly divaricated, and connected by a broad erect membrane, opposite which is an erect fleshy body proceeding from the mouth of the spur." This generic name had, however, to give way to Don's earlier *Diplomeris* (1825), which rested on the Khasia plant mentioned above, although Don's description of the latter, would, in the absence of specimens, be unintelligible. The structure of the central parts of the flower is indeed very peculiar, and it is not surprising that Don as well as, later on, Sir George King, misunderstood it. Lindley and Griffith (in *Notul.* iii. 369, t. cccxxxviii, fig. II; drawn 1835, publ. 1847), however, interpreted it correctly, and the latter's analyses, drawn with great care and accuracy from field material are indeed very helpful in that respect. Both pointed out at the same time the affinity with *Habenaria* (sensu lato) which is very obvious, the main difference between the two genera being in the much enlarged rostellum. The genus comprises so far four species, *D. hirsuta* in the Central Himalaya, *D. pulchella* in the Khasia Hills, *D. Boxallii* in Lower Burma (in swamps) and *D. chinensis* in the Tientai Mountains, Prov. Chekiang, China (on wet rocks).

The plant figured here was received at Kew from Mr. G. H. Cave of Darjeeling a few years ago. It is grown in an intermediate house at a temperature of 15-18°C. (60-65°F).

DESCRIPTION.—A terrestrial, stemless, mostly 1-leaved and 1-flowered *herb* with a globose or ellipsoid tuber about 1-1.25 cm. long, and a few very hairy filiform roots. *Leaf* solitary (with or without a smaller upper rudimentary leaf added), sessile, *pendulous*, *oblong* or *ovate-oblong* from a rounded or obscurely cordate base, acute, 4.5-8.5 cm. by 2-3.5 cm., membranous, fresh green, *loosely and stiffly hairy* on both sides. *Scape* 1-bracteate, *hirsute*, 2.5-5 cm. long up to the bract; bract obliquely ovate in side-view, acute, 1-1.5 cm. long, *hirsute*; bracteole linear-subulate or filiform, up to 5 mm. long. *Flowers* solitary, very rarely two, separated by a slender internode about 1 cm. long, snow-white. *Receptacle* slender, bottle-shaped, ribbed in the lower part, 1.2-1.5 cm. long. *Sepals* almost equal, ovate-oblong or ovate-lanceolate, subacute, 15-17 mm. by 5 mm., *hirsute*, greenish in the bud, then white. *Petals* suborbicular, very shortly apiculate, 13-18 mm. by 16-22 mm. *Lip* spurred, almost kidney-shaped from a short claw, notched with a prominent midrib ending in a short point in the sinus of the notch, 17-22 mm. by 22-30 mm, excluding the claw; spur very slender, descending, curved, 6 cm. long, greenish-white. *Column* very short. *Anther* low, with a broad connective and with each anther-cell produced into a horn which projects forward, clasping the rostellum. *Pollinia* oblong, with a long slender caudicle. *Rostellum* large, erect, obovate-orbicular in front view, concave. *Stigmas* two, linear, oblong, projecting forward with slightly decurved blunt tips.

DISTRIBUTION.—Central Himalaya, from Nepal to Bhutan.
O.S.

Fig. 1, a group of three plants, nat. size; 2, a longitudinal section through a flower, $\times 1.5$; 3, the central parts of the flower in side-view with the stigma (to the left of the figure 3), the spur and the receptacle cut, $\times 3$; 4, the same in front-view $\times 3$; 5, pollinium.



TAB. 9114.
ANEMONE GLAUCIIFOLIA.

RANUNCULACEAE. Tribe ANEMONEAE.

ANEMONE, Linn.; *Benth. & Hook. f., Gen. Plant.* I. 4; *Prantl in Engl. & Prantl, Nat. Pflanzenf.* III. 2. 61.

Anemone glauciifolia, (glaucifolia)* *Franch. in Bull. Soc. Bot. France* XXXIII. 363 (1886) et *Pl. Delavay* 6, t. 1 (1889); foliis pinnato-lobatis ea papaverium quorundam referentibus insignis, nulli speciei nisi *A. Millefolio*, Hemsl. & Wils., plane affinis, a qua vero statura robusta, foliis multo minus dissectis recedit.—Janczewski in *Rev. Gen. Bot.* IV. 250, t. 10 et 11, fig. 12, 13, 14 (1892); Finet & Gagn. in *Bull. Soc. Bot. France*, LI. 61 (1904); Hemsley in *Journ. Linn. Soc.* XXXVI. 455 (1904); Ulbrich in *Engl., Bot. Jahrb.* XXXVII. 201, 240, fig. 3B (1905); *Journ. Roy. Hort. Soc.* XLVIII. liv. (1923).

Syn.: *A. glaucophylla*, Hort. ex Gard. Chron. LXXII. 12, fig. 7 (1922), sphalm. pro *A. glauciifolia*.

A very beautiful and in every way remarkable species which inhabits open dry alpine and subalpine pastures between 2,000 and 3,600 m., from the Tali range northwards to beyond the Yangtse (to about 28° 12' N.). It was discovered by Delavay on the foothills of Yang shan near Lakung at 2,200 m. in 1883. Franchet rightly recognised its peculiar position in the genus *Anemone* when he created for it a new section *Anemoclema*, a name which was meant to indicate “une nouvelle transition (in *Anemone*) vers les Clématites,” a counterpart to the approach of certain African clematises (Baillon's section *Viornanema*) to *Anemone*. In view of this approach Franchet went even so far as to question the existence of limits between the two genera, saying that not a single character can be adduced that is peculiar to one or the other. Hutchinson has since (*Kew Bulletin*, 1920) shown that the species which Baillon quotes for his section *Viornanema* are members of a large and well marked natural group which may well claim generic rank, and for which he proposes the name *Clematopsis*. There is, no doubt, much resemblance between *Clematopsis* and *Anemoclema*, but the latter still differs from *Clematopsis* in the disposition of the leaves, which, whenever the internodes lengthen out, are seen to be scattered (not opposite), in their papaveroid cut, and in the shorter styles with their

* Franchet wrote, evidently by a slip, “*glaucifolia*.” His statement that the leaves by their dissection recall absolutely those of *Glaucium luteum* shows clearly that he meant to indicate that the leaves are those of a *Glaucium* (*Anemone glaucii folio*) and not that they are glaucous (*A. glaucis foliis*), which they hardly are.

sabre-like bend in the ripe state. *Clematopsis* is moreover confined to Africa, including Madagascar and the Mascarenes. To our mind the question is rather whether *Anemoclema* can be retained in *Anemone*. Janczewski, in a series of articles entitled "Études morphologiques sur le genre *Anemone*" (1892-98) which contains much valuable detail, but is hardly comprehensive enough to serve as a basis for a taxonomic revision of the genus, has placed *A. glauciifolia* in DeCandolle's section *Pulsatilloides* (1828), which until then had been reserved for a small group of South African forms. He was therein guided solely by the resemblance of the achenes, the whole facies of the plants being totally different. He moreover included in this section, for the same reason, *A. obtusiloba*, *A. trulliformis* and *A. coelestina*, Himalayan and West Chinese species, no doubt more akin to *Anemoclema*, but still with a different type of leaf. Ulbricht†, who adopted Janczewski's system and extended it considerably, introduced further discordant elements into the *Pulsatilloides*-section, but, recognising the diversity of the group, he broke it up at the same time into no less than six "series," four of which are monotypic and one ditypic, *Anemoclema* ranging among the monotypic series. This is not the place to follow up this artificial arrangement any farther. It may be sufficient to point out that *Anemoclema*, judged by its leaf-type, stands out very clearly from all the anemones known so far, except one, *A. Millefolium*, a Szechuan species with leaves very like those of *Corydalis cheilanthifolia*, and, as this species also agrees in other respects (tap-root, habit—though it is a smaller plant with solitary flowers—and carpels) with *A. glauciifolia*, it may justly be included in *Anemoclema*. This *Anemoclema*, as a group, can, however, hardly claim a higher status than that which we accord at present to the more generally accepted sections of *Anemone*, even if we exclude *Pulsatilla* and *Hepatica*. I have already indicated the distribution of *A. glauciifolia*. *A. Millefolium* joins on immediately northward, the only records being from Southern Szechuan "inter rivulos Pe-Chi et Ka-la-pa" (Schneider, 1225) and from the Yalung river in Western Szechuan, probably in the latitude of Tatsienlu (Wilson 3,050).

† Über die systematische Gliederung und geographische Verbreitung der Gattung *Anemone*, L., in Engl., Bot. Jahrb. XXXVII. 172-334 (1905).

A. glauciifolia was introduced into cultivation from seed sent home by Mr. G. Forrest, who collected the plant repeatedly. It seems to have flowered first in this country with Col. Stephenson Clarke at Cuckfield, Sussex, who in 1922 exhibited a particularly fine specimen at one of the Royal Horticultural Society's shows. The model from which our plate was prepared was grown at Kew from seed of the same origin. Forrest described the colour of the flower as "deep soft blue" or as "pale soft purplish-blue." "Mauve" would perhaps be a more correct description of the tint of the flowers we have seen. Owing to the development of a strong tap-root it may not be easy to grow our plant if there is not a sufficient depth of soil and adequate drainage, but otherwise there should not be much difficulty in its cultivation.

DESCRIPTION.—A perennial *herb*, up to almost 1 m. high, with a stout tap-root and a tuft of basal leaves from the collar, covered by the vestiges of old hairy leaf-bases, from which springs a solitary scape-like flowering stem. *Leaves* with downwards sheathing stalks, the sheathing portion softly silky, long persisting; *blades very variable in size and lobing*, 4–20 cm. by 2–6 cm., *oblanceolate in outline, decurrent on the leaf-stalk, deeply pinnately lobed, the upper lobes tending to become confluent upwards, the lower more distant and decreasing base-wards, all again lobed or coarsely crenate or toothed with the lobules (or crenae) rounded or narrower (lanceolate) or tooth-like and acute, all the ultimate divisions apiculate*, the whole blade loosely hairy with long white hairs, particularly along the midrib on the back, somewhat succulent, dull pale green; *stalks* (up to the first divisions of the blade) 1.5–5 cm. long, winged, hairy. *Scape* simple and leafless up to the involucre, or with a distinct basal internode (up to 3 cm. long) and a solitary leaf or a pair of leaves resembling the basal leaves, 5–30 cm. long (up to the involucre), below smooth and glabrous, 4–7 mm. in diameter. *Inflorescence* a few-flowered umbel or 'reduced to a solitary flower; primary involucre of 3 bracts, linear-oblong to lanceolate, widened towards the base, sparingly lobed or toothed upwards, 3–5 cm. long; pedicels 14–25 cm. long, villous at the base; bracteoles paired, similar to the bracts, but much more reduced and often entire and acuminate, 1–3 cm. long. *Flowers* ovoid, acute and silky-tomentose without in the

bud, 3-11 cm. across: tepals obovate, rounded at the top, 2-5 cm. by 1.2-3.5 cm., mauve. *Torus* short (up to 2.5 cm. long), areolate. *Filaments* 5-8 mm. long; anthers up to 3 mm., oblong, apiculate. *Carpels* ovoid, densely villous, gradually attenuated into the upwards glabrous filiform style. *Achenes* obovoid-oblong, 6 mm. by 2.5 mm., rigidly villous (hairs 1-2 mm. long), crowned by the persistent gently recurved style (6 mm. long). *Embryo* 0.6 mm. long; *cotyledons* distinct.

DISTRIBUTION.—North-west Yunnan and the Szechuan borderland, 2,000-3,600 m. O.S.

Fig. 1, a whole plant, $\times \frac{1}{8}$; 2, a leaf, nat. size; 3, flowers, nat. size; 4, stamens, $\times 5$; 5, a flower after the fall of the tepals and stamens, nat. size; 6, a young achene, $\times 8$.



TAB. 9115.

SCABIOSA ANTHEMIFOLIA.

South Africa.

DIPSACEAE. Tribe SCABIOSEAE.

SCABIOSA, Linn.; *Benth. & Hook. f., Gen. Plant.* II. 159; *Hoeck in Engl. & Prantl, Nat. Pflanzenfam.* IV. 4. 182.

Scabiosa anthemifolia, *Ecklon & Zeyher, Enum. Pl. Afr. Austr.* 371 (1837); *S. Columbariae*, Linn., arete affinis et cum ea confusa differt harum notarum combinatione: foliis inferioribus plerumque ambitu obovato-spatulatis apice rotundatis grosse crenatis vel inciso-lobatis et tunc magis minusve lyratis, calycis setis ante anthesin plane ultra alabastra capituli exsertis, involucri phyllis sub fructu capitulo appressis (haud reflexis), fructibus maioribus, involucelli costis arete approximatis crassissimis sectione transversa quadratis et eius limbo ampliore, setis calycinis plerumque longioribus.

Syn.: *S. maritima*, Thunb., *Prodr.* 29 (1794) et *Fl. Cap.*, ed. Schult., 145 (1823), saltem pro parte, non Linn.

S. Columbaria β *dissecta*, Sond. in Harvey & Sonder, *Fl. Cap.* III. 43 (1864), pro parte.

S. Columbaria (*African form*), T. Hay in *Gard. Chron.* LXVIII. 131, figs. 57, 58 (1920).

S. Columbaria rosea, Hort., J. F. in *Gard. Chron.* LXXVI. 215 (1924).

This very beautiful and promising plant was in 1920 introduced as "The African form of *Scabiosa Columbaria*" by Mr. T. Hay, then of Regent's Park, London. He had raised it from seed received early in the same year from a Mr. Magennis of East London, Cape Colony, who described it as "our native scabious." Now, South African scabiouses have been known to botanists since the seventeenth century, and some of them were already identified with European species (*S. maritima*, *S. ochroleuca*) by Thunberg (1794), though, as it turned out, wrongly; but the first claim of *S. Columbaria* to rank as a member of the Cape flora dates from 1847, when Drège (in *Flora* XIX. 665) referred, without comment, those of his specimens which he had previously distributed as *S. pallida* and others, which had been collected by Zeyher in the Cape Flats, to that European species. This view was subsequently adopted by Sonder in *Flora Capensis* (1864), after which the occurrence of *S. Columbaria* in Cape Colony was accepted as an established fact, with the result that one more puzzle was added to the perplexing problems involved in the composition of the South African flora. When, however, in 1881, J. G. Baker (in *Journ. Bot.* XIX. 179), and in 1883, J. D. Hooker and D. Oliver (in *Journ. Linn. Soc.* XXI. 393), claimed *S. Columbaria* for Kenia, as "a common British plant," to use Baker's

term, a bridge seemed to have been found to connect those widely distant areas in the north and in the south. When then, during the next thirty years, similar records were set up for Yemen, Abyssinia, Kilimanjaro, Angola and other parts of tropical Africa, it seemed indeed, as if *S. Columbaria* ranged in an almost unbroken area from Scandinavia to the Cape with alpine stations in the tropics (up to 4,800 m.) and lowland stations in the north and south. Meanwhile however, the *S. Columbaria* of Europe had become the object of careful study in the field and in the herbaria, with the result that botanists learned to speak of it as a highly diversified group whose mass development was in Southern Europe (and North Africa). Here a bewildering swarm of types is encountered, in striking contrast to the solitary form, which as a post-glacial settler is spread from Central Europe to Scandinavia and from Central and Northern France to England, that is the *S. Columbaria* of Linnæus, as he knew it in the field, and of modern floras. Of the South European forms, several are to-day widely recognised as distinct species; as to the rest, much field- and experimental work is still needed in order to sort out the genetically fixed types from the host of unstable or casual states. Considering the *S. Columbaria* of the Tropical-African and South-African floras, I may say, with all the material of the Kew Herbarium before me, that there is there at least as much diversity as in the corresponding South European plexus. In any case we cannot think of them as mere modifications of our northern scabious. They have no doubt been in their present homes when the latter started on its northward march over the deglaciated land.

That Sonder, when dealing with *S. Columbaria* in *Flora Capensis* was aware of the incongruity of the plants which he included under this heading is evident from the fact that he admitted three "varieties" beside what he considered the typical form. Of these var. *dissecta* with its synonyms *S. laciniata*, Lichtenst. (1818), *S. pallida*, F. Mey. ex Drège (1843, name only), *S. ochroleuca*, Thunb. (1794, non Linn.), and *S. anthemifolia*, Eckl. & Zeyh. (1837), concerns us most directly. *S. laciniata* is an obscure species of which there is apparently no specimen in existence, whilst the description is far too short to render the plant recognisable. It was

collected in Ceres Division and should be sought for there. *S. pallida* rests on a variety of specimens, of which I have only seen a portion. It was never described, so that we may pass it over as far as the name is concerned. Thunberg's *S. ochroleuca* is equally negligible in this respect, as it is certainly not the European scabious so named. *S. anthemifolia*, on the other hand, tallies perfectly with our plant, which will therefore have to carry this name. It was collected by Ecklon and Zeyher about 1830 in sandy places in the Vanstadensbergen in Uitenhage Division and described by them in 1837. Several other specimens in the Kew collections, belonging to this species and attributed to Zeyher, come evidently from the same region, whilst one in Alexander Prior's herbarium marked Simon's Bay, establishes a considerable westward extension of the area.

S. anthemifolia, like other species of its group, behaves essentially as a biennial, flowering, however, already the first year. It has not stood the winter at Kew, but as it produces plenty of fruit, it may well be treated as an annual. If germinated in a warm frame and planted out late in the spring, it will flower in the summer and continue to do so until the autumnal frosts set in. It forms large bushes with more or less rosette-like tufts of leaves from the basal shoots, which occasionally grow out into short runners. The flower-heads obtained in cultivation are considerably larger than those seen in herbaria, the plant like other scabiousses responding readily to a rich soil. Ecklon and Zeyher describe the colour of the flower as violet. Those observed in cultivation were mostly rose or slightly mauve, as shown in our picture. The latter was prepared from one of a group of plants obtained from Mr. Hay and grown at Kew in a large round bed with charming effect.

DESCRIPTION.—A perennial, apparently short-lived herb, 30–75 cm. high, often with short (up to 12 cm. long) slender runners. Stems erect or ascending with 3–5 leaf-pairs, simple or branched, all the internodes short or the upper elongated (up to 10 cm.), *reverse tomentose or pubescent*. Blades of the basal leaves (including the primary leaves, which decay early) of the flowering stems and of the runners *obovate or obovate-spatulate in outline, more rarely oblanceolate-oblong*, long attenuated into the leaf-stalk, *rounded or at any rate blunt at the apex*, coarsely crenate or lobulate or deeply

lobed, and then with the *terminal lobe by far the largest* (lyrate leaves), the blade up to 8 cm. by 2.5 cm.; blades of the intermediate leaves sessile, more narrowly and deeply divided with the lobes lobulate or bluntly dentate; blades of the uppermost leaves pinnatifid, 3–6 cm. long, with sub-linear lacinulate toothed or entire and often acute segments, 1–2 mm. wide; all the leaves loosely and softly hairy, rarely the basal almost villous; leaf-stalks of ground leaves 2 to 7 cm. long. *Peduncles* of the main axis up to 3, of the branches 2 or 1, 15–40 cm. long, *reversely and appressedly hairy or almost tomentose below the heads*. *Heads with large ray-flowers, in the wild plant up to 4 cm., in the cultivated plant up to 6.5 cm. in diameter*: involucral bracts 8–10, rarely more, almost 1-seriate, linear-lanceolate or linear, subacute, the longer 5–7 mm. long, subtomentose, *appressed to the fruit-head, not reflexed*: torus oblong, 4–6 mm. high, hairy, honey-combed; floral bracts oblanceolate-subulate, 3–4 mm. long, white-strigillose. *Involucel* in the fruit much enlarged, tube 4–5 mm. long, with 8 narrow grooves and as many stout ribs, square in cross-section and with white stiff appressed hairs on the back, limb, up to over 2.5 mm. high and up to 8 mm. in diameter. *Calyx*-bristles blackish or reddish, in the flower 5–6 mm., in the fruit up to 12 mm. long; terete, scaberulous above the short widened glandular base, *in the young heads conspicuously exceeding the flower-buds*. *Corolla of ray-flowers* in the wild plant up to over 15 mm., in the cultivated plant to 27 mm. long; lobes of the lower lip obovate, up to 11 mm. (in the cultivated plant 20 mm.) long, of the upper lip broadly obovate, 2.5–3 mm. by 4 mm. *Corolla of the disc-flowers* (inner) 7–8 mm. (in the cultivated plant to over 10 mm.) long; tube funnel-shaped; lobes ovate to rotundate; *all the corollas silky without, rose to violet*. *Anthers* almost 3 mm. long. *Receptacle* slender, mature, bottle-shaped, faintly 8-ribbed, minutely hairy, 2.5 mm. long. *Style* 7–8 mm. long; stigma truncate capitate.

DISTRIBUTION.—Cape Colony. Coast-region from Algoa Bay to Cape of Good Hope. O.S.

Fig. 1, part of a flowering stem cut below the third leaf-pair above the base, nat. size; 2, a basal leaf (but not primary), nat. size; 3, a ray-floret, $\times 1.5$; 4, a ray-floret cut open and expanded, $\times 1.5$; 5 a disc-floret, $\times 3$; 6, corolla of a disc-floret cut open and expanded, $\times 3$; 7, disc-floret with the corolla removed $\times 3$; 8, a fruiting head seen from below, nat. size; 9, a mature floret, $\times 3$; 10, the same in longitudinal section, $\times 3$; 11, transverse section through the tube of a mature involucel, $\times 6$; 12, an outer bract of a mature involucel, $\times 2$.

